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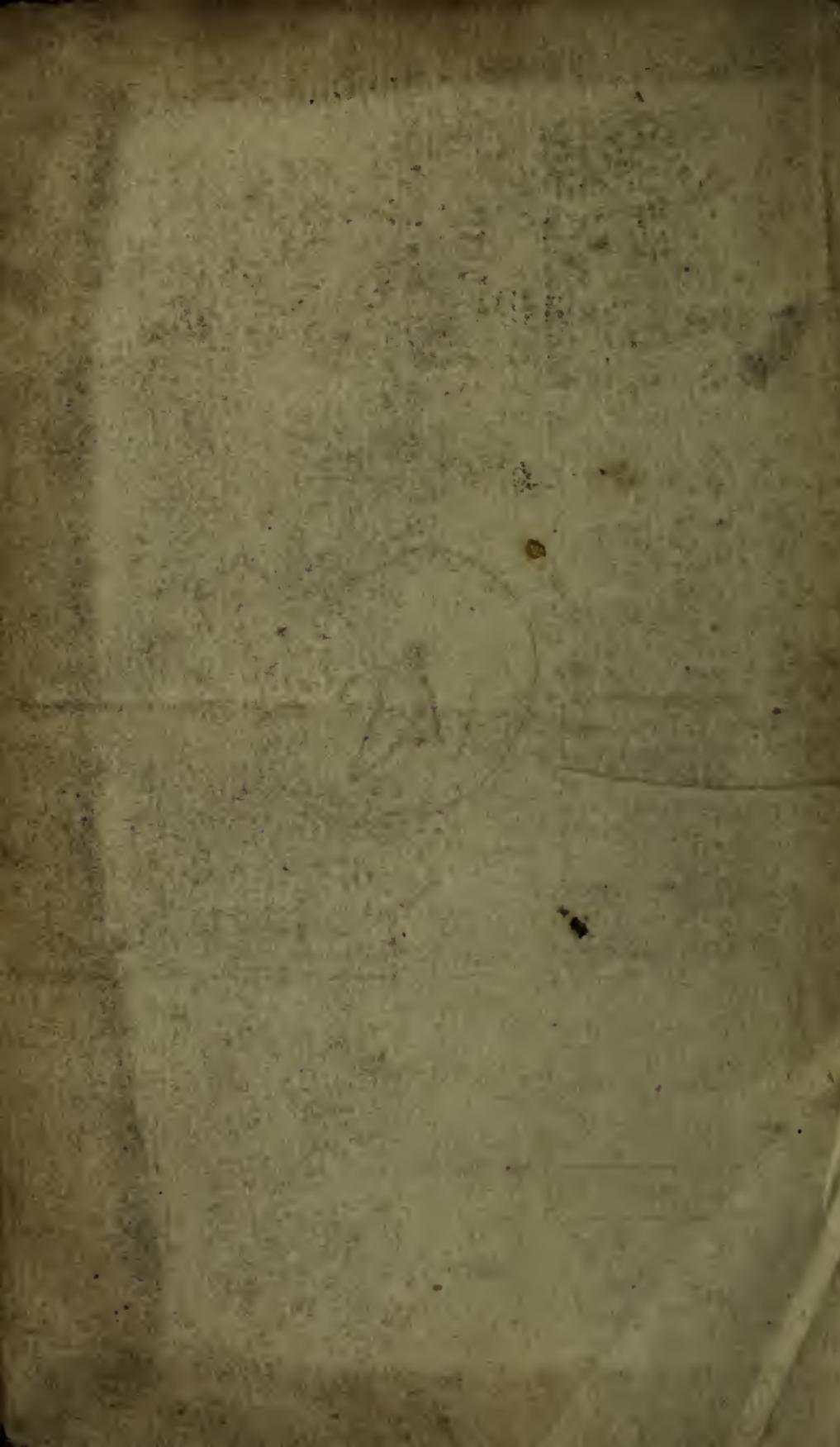
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Secrets concernant les
arts et les matières
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SECRETS

I N

ARTS and TRADES: OR, APPROVED Directions from the best Artists.

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J. SCATCHERD, No. 12, Ave-Maria-Lane; and
J. BARKER, at the Dramatic Repository, Russell-Court, Drury-Lane.

[Price 4s. Sewed.]

[c. 1794]



THE EDITOR's P R E F A C E.

THE Arts cannot attain a higher degree of perfection, till more exact enquiries are made concerning every thing which can contribute towards facilitating their progress. It ought, therefore, to be the study of every individual to diffuse his observations, and extend his researches, in a country where he can claim a liberal encouragement for Discoveries, or the Promulgation of Arts in general. Among those who discharge their duty in the most becoming manner, the British Artists, and professed Mechanics, are undoubtedly entitled to the first rank, as their experiments, and productions, are evident and real.

It is but of late years since those Arts and Trades, which constitute the wealth and commerce of Great Britain, begin to increase their lustre

lustre, œconomical order, and necessary distribution, in this great kingdom.

The present work is a faithful compilation of various secrets in the refined Arts and Trades: discoveries no way unworthy an *Englishman's* attention.

The ART of ENGRAVING, in its infant state here, will, if not benefitted, at least be settled on a more permanent basis, by a due observation of the directions and receipts contained in this volume.

The various combinations and compositions of METALS; the Art of VARNISHING, of making MASTICHS, and CEMENTATIONS; Curiosities in GLASS and PRECIOUS STONES; the MIXTURE of COLOURS, in Painting; the Art of GILDING; DYING WOOD, BONES, IVORY, &c. together with the various methods of MOULDING; which will be found useful, if not absolutely necessary, towards facilitating the progress of those Arts in *Britain*, where taste and elegance seem to claim a proportionable

able share of the public's attention and encouragement.

The other matters are useful to those who wish to be easily accommodated with the polite and useful necessaries of a frugal life. They are intended chiefly for those who have had few opportunities to learn the proper methods of making the best use, in ART, of those articles which Nature profusely lavishes for the nourishment and taste of domestic felicity.

Many of the following Secrets and Receipts spring from the first artists in *France*, *Italy*, and *Germany*, are translated from the *French*. Several eminent artists here have given great additions and assistance towards rendering them easy to be understood by the most common capacity, especially those technical terms peculiar to the various Arts and Trades mentioned.

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SECRETS

IN

ARTS and TRADES.

C H A P. I.

SECRETS relative to the ART of ENGRAVING.

I. *A wax to lay on iron or steel.*

TAKE the bulk of a nut of white wax, melt it, and add to it the size of a musquet ball of ceruse of *Venice*. When both are incorporated, form this composition into small sticks. With them rub your piece of steel, or iron, after having previously warmed it sufficiently to melt the wax, which spread well over it with a feather. When the wax is cold, trace whatever you will on it, and pass afterwards, on the lines you have drawn, the following water.

II. *A mordant water to engrave on steel.*

1. Take the strongest verjuice you can find; alum in powder, and a little dried salt, pulverised. Mix all together till perfectly dissolved: then pass some of that water on the lines of your drawing, repeating the same till it is sufficiently deep engraved.

2. Or else take verdigrease, strong vinegar, ammoniac and common salts, and copperas, equal parts. Set all together a boiling for a quarter of an hour: then strain it

through a rag, and run some of that water on your plate. In about half an hour afterwards it will be perfectly engraved.

3. CALLOT's varnish, of which the composition shall be found hereafter, in the *Chapter on Varnishes*, is an admirable composition to lay on the plate you propose to engrave.

III. To engrave with aquafortis, so that the work may appear like a basso relievo.

Take equal parts of vermillion and black lead; two or three grains of mastick, in drops. Grind them all together, on marble, with lintseed oil; then put this composition into a shell. Next to this operation, cut some soft quills, and let your steel or iron be well polished. Try first, whether your colour runs sufficiently with your pens; and if it should not, you must add a little more oil to it, so as to have your pen mark freely with it, as if you were writing with ink, on paper. Then rub well your plate of steel with wood ashes, to clean and ungrease it; after which wipe it with a clean rag, and draw your design upon it, with your pen, prepared as before, and dipped into your liquor. If you want to draw birds, or other animals, you must only draw the outlines of them with your pen, then fill up the inside of those lines with a hair-pencil; that is to say, you will cover all the space, contained between the first outlines drawn with the pen, with the same colour, which you will lay with a brush, to preserve all that part against the mordacity of the *aquafortis*. When that is done, let your work dry for a day or two; and when dried, take some fire, made with charcoal, into a chafingdish, and bake over it your colour, by degrees, till it becomes quite brown. Take care notwithstanding not to burn it, for fear you should scorch it when you come to scratch, with the point of a needle, those etchings, or places, which you want to be engraved, with the following *aquafortis*.

IV. Aquafortis for engraving.

Take verdigrease, roch alum, Roman vitriol, and common

mon salt, of each three ounces; pound it into a very fine powder. Have a new pipkin, put a little more than a quart of water, and your drugs, all together. Let them thus infuse a couple of hours; then place them over a charcoal fire; and when the water has a little simmered, take the pot from off the fire, and let it cool, that you may dip your hand in without scalding. Then have an earthen cup, with which you take off that water, and pour it over the work you mean to engrave; so that it may run freely over all the places which are to be marked, and then off into a pan placed under to receive it. Continue thus to water your work for three quarters of an hour. Then you will pour upon it clear pump water, to wash off the mud which the *aquafortis* shall have occasioned. You are then to try, with a needle, the depth of the lines of your engraving; and, if not at your liking, you must begin again watering it, as before. The only care you are to have, is, that your liquor should not be too warm; for then it would spoil the work. It is better to use it lukewarm only, and be longer at it.

V. To engrave on brass, or copper, with aquafortis.

You must put in your colour more mastick in drops, and bake it also rather more over the fire, after it is laid on your plate; so that it should almost turn black. And if it be a flat work, as generally are all those on copper-plates, you must raise around it a border of wax to prevent the *aquafortis*, which you are to pour on it, from running off, and which is to be a separating *aquafortis*, with which you cover the plate to the thickness of a crown piece. After it has been thus left covered with that *aquafortis*, for a little while, this becomes green; then is the time to throw it away, and to pour in its place some pump water; when you will examine whether the lines be sufficiently deep or not. If not, pour again fresh *aquafortis* on your plate, and thus you will obtain works of *basso relievo* by contrary; that is to say, raised grounds. You may thus engrave all sorts of works.

VI. *To engrave prints by aquafortis.*

Take some ceruse; grind it well with clear pump water, and size it with isinglasse. Lay this composition, with a coarse brush, or pencil, on the plate which you want to engrave. When it is dry, draw on it whatever design you please. Or, if you want to counterproof a copperplate print, blacken all the back of your print; and placing that blackened part on your plate, prepared as before, go over all the strokes of your print, with a smooth ivory, or wooden point; which will stamp the black of the print, in all those places, on the plate. Then you will go again over all the black strokes, which are laid on your plate, with a pen and ink; and taking afterwards a steel point, very fine and well tempered, you will etch your plate with it, in following all the strokes marked on it, and pour *aquafortis*, as before directed.

VII. *Another.*

Take white lead, and grind it well with mastick in drops. Cover your plate with it by means first of a brush, and then smooth it with the soft part of a goose feather. Let this dry for a day or two; then give a second coat, of this composition, over the first; and spread it with the palm of your hand. When dry, bake it over charcoal, till it comes a little yellow; then draw what you will over it, with a black lead pencil; and proceed afterwards, as before directed.

VIII. *The method of engraving with aquafortis.*

1. You must have a very well polished plate, and perfectly clean. Set it to warm over a chafingdish, in which there is a charcoal fire. While on it, cover it with a varnish, either dry or liquid, for there are two sorts. Then you blacken that varnish with the flame of a candle, over which you pass, and repass, the plate on the varnished side.

2. This being done, you have no more to do than to chalk your design on that plate, which is infinitely more easy

easy than to engrave with the graver. For, if you rub the back part of your drawing with some sanguine stone (red chalk) or any thing else, and lay it afterwards on your plate, to trace it with a point, the sanguine, which is on the back of the draught, will easily set off on the varnish. So that you may follow afterwards all the lines of the design, and be infinitely more correct in all the turns, and the expression of the figures. This is the reason why all the painters who have their own works engraved, take the trouble of drawing also the outlines of their figures, that the spirit and beauty of the design may be preserved. Indeed it must be confessed, that we always discover a great deal more art in those pieces which are engraved with *aqua-fortis*, than there is found in them that are done by the graver. And, even in many of these, the *aqua-fortis* is often employed to sketch lightly the *contours*, or outlines of the figures, and to have them more correct.

3. True it is, that it is sometimes found necessary to touch a little over with the graver certain parts which are not strong enough, or that the *aqua-fortis* has not eaten in sufficiently. For it is not easy, in a great plate, to get all the several parts so proportionably, and *a propos*, eaten in, as there should be nothing to find fault with.

4. It is not enough for an engraver to work with the point of his needle, or scooper, in all the different places of his work, with the strength and delicacy necessary to make appear, as he wants them to be, the most remote and the nearest parts. It is again requisite that he should take care, when he comes to put the *aqua-fortis* on his plate, it should not bite equally every where. This is prevented, as follows, by a mixture of oil and tallow, which you will drop in it, from a lighted candle.

5. To this effect he must have a framed wooden board, overlaid with wax, on which he fixes his plate a little slant way; then pours *aqua-fortis* on it, so that it may only pass over it, and run into an earthen pan, placed under to receive it. Therefore he takes care to examine when those parts, which are not to be so deeply eaten in, have received a sufficient quantity of *aqua-fortis*; in which

case, taking off his plate, he washes it with pump water, by pouring it only over, dries it gently before the fire, then covers the most remote parts, and them which he wants to preserve weakest, with the abovementioned mixture of oil and tallow, that the *aqua-fortis* should not act, any more, on those places. Thus, covering at several times, and as much as he pleases, such places of his plate as he wants to keep not so strong as others, it results that the figures, which are forwards in the picture, are constantly every time washed with the *aqua-fortis* which eats in them, till he sees they are sufficiently engraved, and according to the degree of strength which he is desirous of giving them.

6. That sort of *aqua-fortis* we have mentioned and described in this chapter at the article of the *water for engraving on iron*, and which is composed with verdigrease, vinegar, common and ammoniac salts, and copperas, is also made use of to engrave on copper, in pouring it on the plates, covered either with hard or soft varnish, and scratched, or etched, agreeably to the design you intend to engrave on them.

7. As for what concerns the refiner's *aqua-fortis*, commonly called *white water*, it is never used but upon the soft varnish, and never as the former, which is called *green water*, by pouring it only over the plate, and letting it run off into a pan under it. A border of wax must be made round the plate, on which, this being laid flat upon a table, some of that *white water* is poured, after having previously tempered it more or less with a proportionable quantity of common water, which is called *pickling*.

IX. To engrave on wood.

You begin by preparing a board, according to the size and thickness you want it, and finely polished on the side it is to be engraved. The sort of wood which is generally chosen for such a purpose, is either pear-tree or box. And, of the two, this last is even still preferable, both on account of its being of a superior hardness, and also less liable to be worm-eaten. On that board you draw

draw first your design, such as you want it to appear in printing. They, who have not the talent of drawing, as there are a great number who make use of the very drawing you give them, which they paste on their board, by the right side, with a paste made of good flour, water, and a little vinegar. You must take care that all the strokes of the drawing should touch well, and stick on the wood; and, when the paper is very dry, wet it gently, and with the tip of your finger rub it off by degrees, so that the strokes only of the drawing should remain on your board, as if you had drawn it with ink and a pen. These strokes, or lines, shew all that you are to spare, or preserve; all the rest you are to cut off and sink down with delicacy, by means of a sharp and well-tempered pen-knife, small chisel, or *gouet*, according to the size and delicacy of the work, for you have no need of any other tool.

X. To engrave on copper with the graver.

1. When the plate, which is to be of red copper, is well polished, you draw your design on it with either the black lead stone or a steel point. When that is done, you have no further need of any thing but a sharp and well tempered graver to cut in, and give more or less strength to certain parts, according to the subject, and the fine figures you execute.

2. You must also have a certain tool of six inches long, or thereabouts, one of the ends of which, called a Scraper, is made in the form of a triangle, sharp on each edge, with which you scrape on the copper when you want it. The other end, called a Burnisher, has very much the shape of a fowl's heart, a little prolonged by the point, round and slender. This serves to polish the copper, to mend the faults, and soften the strokes.

3. In order to form a better judgment of your work, you must now and then, as you proceed on, make use of a flump, made with a piece of an old hat rolled up and blackened, with which you rub your plate, on the place you are working, which fills the strokes with

black, and makes you see better the effect of your work, as you go. You must be provided likewise with a leather cushion, on which you lay your plate, while you engrave it.

4. We shall not give any further account of the art of engraving than this short epitome, and we shall not attempt to enter into a more particular detail of the various and curious circumstances attending this noble art. They whose curiosity on that subject will prompt them to be more particularly acquainted with it, may amply satisfy themselves, by taking the trouble to read the treatise which *Abraham Boffe* has purposely composed, on the art of engraving.

XI. *To engrave on steel or iron; such as blades of swords, knives, &c.*

1. Take one part of linden-tree coals, two of vitriol, and as much of ammoniac salt. Grind all together with vinegar, so as to obtain a soft paste of it. Then, whatever you want to engrave on steel or iron, begin first by sketching it with vermillion diluted with lintseed oil, which you shall have put a drying, to use it afterwards like a pencil. When your drawing is done, cover it with the abovementioned paste to the thickness of a finger. This composition must be applied warm; and the more warm it is, the sooner the work will be engraved; though you must have care not to burn it. When this composition is well dry, take that powder off, and wash well the engraved place.

2. You may to the same effect take Spanish verdigrease, or common salt, one part; and while you pound it in a mortar, add some very strong vinegar, and proceed as above.

3. Some make use of vitriol, alum, common salt, and linden-tree coals, which they prepare and use as above directed.

XII. *A water to engrave on iron or copper.*

1. Take Spanish verdigrease, sublimate mercury, vitriol, and alum, equal parts. Pound it all well in a mortar, and put

put it in a glass vessel, sufficiently large, with a proportionable quantity of the strongest distilled vinegar. Let the whole thus infuse for twelve hours, stirring it often. Draw next what design you like, on a coat of wax laid on your iron, or copper, either with a steel point, or factitious ocher, mixed with lintseed oil. Then pass some of your liquor on the places you shall have etched with a needle or steel point, in following carefully the strokes of your design, if it be first drawn on wax. For, in the use of this method, you must not fail to begin by covering first your plate with it, as we said elsewhere. You may again lay on your design, prepared as we said, some sublimate alone, finely pulverised; then pour over it good strong vinegar, which you will let lay for the space of half an hour, after which wash it with cold water, and clean off your plate.

XIII. *Another more mordant water.*

1. Take Spanish verdigrease, *alumen plumeum*, ammoniac salt, tartar, vitriol, and common salt, of each a quarter of an ounce. When the whole is well pounded, and mixed with the strongest vinegar, let it thus remain for the space of half an hour. If you want to have your design raised, make it with factitious ocher and lintseed oil, well ground and mixed together, and let it dry perfectly. Then set the aforesaid water a-warming over the fire, in an iron pan well tinned with lead; and, leaving it on the fire, take your steel plate, and holding it in one hand over the pan, take with the other of the warm liquor, with a spoon, and pour it on your plate; so that by falling again into the pan, you lose none of your water. Continue so doing for a quarter of an hour's time; taking care, however, your water should not be too warm, lest it should set a-running the oil which is mixed with the varnish. When this is done, rub the aforesaid composition with pot ashes, mixed with an equal quantity of quick lime in powder, and you will find that what was covered with the composition will be preserved, and raised from the other parts of the plate which are eaten down.

XIV. *An ardent water to engrave steel deeply, or even eat it off entirely.*

Take two quarts, or thereabout, of thick black wine, the oldest and the best you can find. Dissolve into it quick lime, and brimstone in powder, wine tartar and white salt, of each equal parts, and as much of the whole as there can possibly be dissolved in that quantity of wine. You shall next put all that mixture into a *cucurbit*, or rather in a *retort* well luted. Adapt to it a *bolt-head* to serve as a receiver. Lute well the joints, then give it the heat gradually. There will distil a very mordant water, which you may keep in a phial, carefully stopped, for use.

C H A P.

C H A P. II.

SECRETS relative to METALS.

I. *Transmutation of iron into the finest German steel.*

1. TAKE clean foot one pound; oak wood ashes twelve ounces, and four of pounded garlicks. Boil all together in twelve pounds of common water, reduced to four pounds. Strain this, and dip in it the iron pegs, which you will afterwards stratify with the following cement.

2. Take burnt wood coals, otherwise called *cokes*, and quick lime, of each three pounds; foot dried, and calcinated in an iron pan, one pound; decrepitate salt, four ounces. Make of this and your iron several beds alternately, one over another; and having well luted the vessels in which you shall have made those beds of iron and cement, give them a reverberating fire, for three times twenty-four hours, and the operation is done.

II. *To make tin.*

Take a discretionable quantity of rye-bran, quite pure, boil it a minute or two in vinegar, then add to it a little water, and in that same instant plunge your sheets of black iron; then take out of the fire, and stop well, the vessel. Let your iron rest there and soak for twenty-four hours, after which time take off your iron sheets; score them well with the very bran with which they were a-soaking, then rub them over a little with grindstones. This being done, make them soak again in a water wherein you shall have dissolved some ammoniac salt, whence having taken them off, set them a draining, and rub them afterwards with rye-bran, and your *tin* will be done.

Observe that the vessel in which you lay your sheets soaking, must be large enough to receive them in their full intended size.

III. *To break an iron bar as big as the arm.*

Take melted soap, with which you will rub your iron bar at the place where you would have it break. Then with any thing take off and clean away part of that unctuous, in the middle of it, about the width of half-a-crown. Then take a sponge, dipt into ardent water of three distillations, bring it round the bar, and in six hours it will break.

IV. *Another for the same purpose.*

In two pounds of *aqua fortis*, dissolve orpine, sulphur, regal, and verdigrease, one ounce of each; of quick lime killed in two ounces, of triple distilled vinegar one ounce. Place the whole in an alembic, with one ounce of saltpetre, and two of ammoniac salt; and, having given a gradual fire to it, you will take the spirits which shall have distilled, and put them again over the *fæces* or residue, with an addition of two ounces of pulverised arsenic. Distil this a-new, and keep what arises from it. In this, if you dip an handkerchief, and turn it round an iron bar, in three hours time it will break with the greatest ease. You must only take a great care to guard yourself against the fumes, in distilling this composition.

V. *To compose a metal of a gold colour.*

Take refiner's copper six ounces; melt it in a crucible; add one ounce of calaminary stone; half an ounce of tutty, and one of *terra merita*, in powder. Give to this a melting fire for five or six hours running, then take off the crucible from the fire. Put this composition in powder, and add to it two ounces of common mercury, six of sea-salt exsiccated, and a sufficient quantity of water. Set the whole a-boiling, until there appear no more mercury. Then put the matter into a crucible, and place it between two fires of kindled coals, avoiding carefully the breathing.

breathing of the fumes. Give this a melting fire, for two hours, then wash the composition in water, till this runs off quite clear. Set this again in a crucible; and, when melted, pour it into an ingot. This will give you a metal, of the most beautiful gold colour, which you may make use of for plates, buckles, snuff boxes, cane-heads, &c.

VI. Another composition of metal.

Take a reasonable quantity of the leaves of *Persicaria urens*, called *Arsmart*, or vulgarly, Water-pepper, which you will dry in the shade. Melt in a crucible six ounces of refiner's copper, and when melted, throw in one ounce of powder of the arsmart's leaves, or even half an ounce; then cover the crucible with an iron lid, and keep this matter in fusion for the space of one hour, after which you cast it in an ingot. This process will give you a metal which (except the colour that artists can at any time give it by an industry well known to them) has otherwise all the qualities of gold. The only defect is, that it cannot bear testing, and that it must therefore serve only to supply common copper which rusts easily, and has not so much brightness. It may be used for candlesticks, and other similar works.

We thought it was proper here to give this receipt, as it is to be wished we could make ourselves those metallic compositions, which we import from Holland, and other countries.

VII. To dissolve gold in your naked hand.

Distil hart's blood just killed; and, after having drawn the spirits *per ascensum* in *balneo-marie*, cohobate again three different times. At the third distillation you sublime all the fixt; and, when done, lute well the vessel, and keep the liquor for use. This liquor, carefully preserved, will dissolve gold in the naked palm of your hand.

VIII. How to give some perfection to imperfect metals.

It is well known that gold is the most perfect of metals.

tals. After this comes silver, the principles of which are very near pure, and equally proportioned between them as those of gold. All other metals are reckoned imperfect and crude. Among them however, that which approaches nearest to perfection, is copper. This therefore may easily be purified, by being delivered of all the superficial and combustible sulphurs with which it is loaded. And whoever will proceed, according to the following direction, will not fail to obtain it.

1. Take what quantity you please of copper. Set it in a crucible over a melting fire. While melting in that crucible, throw in at different times some tutty-powder mixed with equal parts of refined saltpetre. Then, the detonations being made, take the crucible out of the fire and let it cool. Break the crucible and separate the scories from the regulus. Put the copper regulus into another crucible, and reiterate the same operation three times, till the copper is extremely fine and true gold colour.

2. Now, if you set it a melting for the fourth time, and project on it persicaria or hydro pepper leaf powder, you will render it still more perfect; and you might thus purify it so far, as to give it, at last, all the qualities of gold.

3. Whoever will know how to purify brass from its foreign sulphur, will turn it likewise into a very fine silver.

4. You may also whiten lead; and, giving it the hardness of silver, render it similar to it.

5. Pewter and quicksilver may likewise be purified, in separating from this last its arsenical sulphurs, and fixing it by the supplement of a fixt, metallic, incombustible and solary sulphur. The other may, by taking off from it its superfluous saline part, and uniting its mercurial one to the true metallic sulphur. But this we cannot expect to attain, if not previously versed in the method of dissolving, analysing, and dividing or separating, and then re-embodying again metallic substances; and this is known by none but the sons of the art, the adepts alone.

IX. To melt metals in the shell of a nut, without burning it.

Take saltpetre two ounces; sulphur half an ounce; oak, walnut-tree, or any other very dry wood sawdust half an ounce. Let the sawdust be sifted very fine, and the saltpetre and sulphur reduced to an impalpable powder. All this being well mixed together, fill the shell of a nut with it to the brim; then lay over it a piece of gold, silver, or any other metal you please; and, having covered it again with the same powder, set the fire to it, and you will see that the metal will melt, and remain at the bottom of the shell.

X. To increase the virtue of a loadstone.

You must let it soak, for forty days, in iron oil.

XI. To restore gold to its weight, after it has lost it in regal water.

Put a bit of tortoise-shell to soak, for some time, in regal water. Then put your gold in it, and by that means, it will recover its lost weight.

XII. To operate the transmutation of silver into gold.

1. Get a new iron pan to grow red hot upon a trivet, and then put two pounds of lead in it. As soon as this is melted, throw over it, by degrees, some good saltpetre pulverised. This will melt likewise. Keep it thus in fusion till it is at least half dissipated. Should it take fire during that time, it does not signify, for it hurts nothing, and the more concocted over again the saltpetre is, the stronger is the oil.

2. Let this cool, divide the saltpetre from the lead. After having well pounded it on a marble stone, carry it into the cellar. There it will fall into *deliquium*, which you will pour into a cucurbit, with double its weight of true French spirit of wine, added by little and little at a time; then distil by a slow fire. Grind on marble, as before, what remains in the cucurbit: and, being turned into *deliquium*, put it again into the cucurbit, with some more

more spirit of wine. Take off these dissolutions and cohobations, repeating the same process over again as before, till the saltpetre remains at the bottom of the cucurbit resolved into a true oil, which congeals itself no longer, and this will procure you what is called the Fix-balm.

3. Next to that operation, you will make an *aqua fortis* with equal parts of saltpetre, dried vitriol, and roch-alum; and, before you put the receiver to the cucurbit, add steel filings, antimony, verdigrease, in subtle powder, tutty and cinnabar, of each half an ounce, or one ounce, according to the quantity of *aqua fortis* you want to draw. Cohobate the spirits seven times over, upon the *fæces*, which you will grind each time on a marble table.

4. Dissolve one ounce of silver in three of this liquor; and, on that solution, still, drop by drop, one ounce of nitre oil in a bottle made like the hour glasses, which after the operation must be at most only half full, and which you will cover with another inverted, so that the neck of the under one should get into that of the upper one. Or else, put it in a mattress with a long neck, which you will seal hermetically; but, if you make use of bottles, take care to late well the joints. Place this over hot ashes, and plunge it in them to the height of six inches. Give under this a lamp fire, which should not reach the matter by three fingers distance. You will get every day to the amount of a silver pennyweight of silver fixed into gold. And, when the whole shall have been fixed thus, day after day, the *aqua fortis*, which before was green as an emerald, will become as clear as pump-water. Let the composition cool, and divide the water from the oil, which will never be the worse for use, and must therefore be preserved. At the bottom of the vessel you will find the silver fixed into gold.

XIII. Fixation of gold into silver.

1. Sublime, on a sand fire, some arsenic, with an equal weight of decrepitate salt. Take the middle and crystalline.

crystalline matter which sublimates, rejecting the subtle flour which rises on the head, and the dregs which remain in the bottom. Sublime over again this crystal, and reiterate so many times as necessary, that no flour should longer sublimate.

2. Calcinate some silver with mercury, with which amalgamate it, and this as many times as you may find necessary, that the water in which you wash your silver, after the dissipation of the mercury by means of fire, should run as fair and clean as when you poured it over it.

3. Take one ounce of this calcinated silver, and four of the aforesaid arsenic; sublime the whole so many times as necessary, that nothing should ascend any more. This sublimation may easily be performed in a mattress laid on its side, which you must turn so as to put always underneath what is sublimed above. By means of such an industrious practice, you avoid the necessity of breaking your mattresses every time you want to re-sublime what was already sublimed. At last the matter turns into a stone, which having pounded, put on a digesting bath, till it is all reduced into a fixed oil, which you know to be done by the transparency of the vessel.

4. Take four parts of mercury, and one of that oil. Put first the mercury into the crucible, and, afterwards, this fixt oil. Give a gradual fire, till all the composition be reduced into a lump, which adheres to the crucible. Take it out and test it; you will find it to be the finest silver in the world.

XIV. *To extract mercury from lead.*

Take pearl ashes one pound; vine ashes four; quick lime one; and pebbles calcinated two. Make a strong lye of the whole with distilled vinegar. Dissolve in this two pounds of lead; and, when the lye is become white, throw in ten ounces of borax. When this is dissolved, throw the whole into a retort, and distil it with a gradual fire. You will get, into the receiver, ten ounces, at least, of quicksilver.

XV. *Another*

XV. *Another mercury from lead.*

Take lead filings one pound; ammoniac salt four ounces; bricks powdered into a powder, three pounds. Distil this composition in a retort, on a gradual fire. The receiver must be very large, half full of water, and the fire must be continued for twelve hours, pushing it by degrees, to the very last.

XVI. *Permutation of lead into silver.*

Take fine lead; calcine it with common salt, or else with that sort of salt which is extracted from the dregs, *fæces*, or *caput mortuum* of saltpetre and vitriol calcinated both together. Soak the whole warmly with oil of vitriol, till you make it come into an unctuous paste. This put in a pot, or crucible, well luted, and placed in a pan full of sand, with which you will cover it over entirely. Make under this a digesting fire; that is to say, such a fire as is necessary to warm the sand; keep it so for ten days, then take off your matter and test it. Cut off one hundred and five pounds weight of lead, you will draw five marcs or two pounds and half weight of silver, capable to stand the test.

XVII. *Fixation of saltpetre.*

Melt some lead in a crucible, and project on it pulverised nitre, reiterating the projections in proportion as the matter fuses, till it is entirely melted.

XVIII. *Transmutation of iron into copper.*

Iron is easily changed into copper by means of the vitriol. To do this, put your iron, *stratum super stratum*, in a descensorium, and set it over a strong blast fire, pushed by bellows, till the iron melts and flows into copper. You must not forget, when you have made your beds of vitriol, to water them a little over with vinegar saturated of saltpetre, alkaline, and tartar salts and verdigrease.

XIX. *Another*

XIX. *Another to the same purpose.*

Pound some vitriol in powder, and distil the spirits from it by means of the retort. Replace the spirits on the *caput mortuum*, then plunge and extinguish in them some red hot iron laminas, or filings; and, by little and little, the iron will turn into copper.

XX. *Another.*

Dissolve vitriol in common water; pass it through filtering paper, then evaporate the water unto a *pellicula*, and put it in the cellar, for one night, and you will obtain some green crystals. Redden them in the fire, then dissolve them three or four times in distilled vinegar, drying them every time, till these crystals become red. Dissolve them again in the same vinegar, and extinguish in it some red hot iron laminas, filings, or any other iron rubbish, they, and every one, will, by these means, turn into a very fine copper.

XXI. *To preserve the brightness of arms.*

Rub them with hart's marrow. Or else, dissolve some alum powder with the strongest vinegar you can find, (that of *Montpellier*, which serves to make their famous verdigrease, is the fittest) and rub your arms with it. By these means, they keep for ever bright and shining.

XXII. *To manage steel so, that it may cut iron as it were lead.*

Draw, by an alembic, the water which will come from a certain quantity of earth-worms; join with this water an equal quantity of horse radish juice. Then temper, four or five times, in this liquor, your iron kindled red hot. That sort of steel is made use of for knives, swords, and other instruments, with which you may cut iron with as much ease as if it were lead.

XXIII. *To*

XXIII. *To soften steel.*

Take a discretionable quantity of garlick, rob them of their coarsest peel, then boil them in oil of nuts, till reduced into an *unguentum*. Cover well your steel all over with that composition, to the thicknes of half a crown. When this is done, put your steel, thus covered, in the forge, in the live coals, and it will become soft. To restore it afterwards to the temper, called by artists *red cherry colour*, you must, after having made it red hot, plunge it in the coldest water.

XXIV. *To extract mercury from antimony.*

Take antimony and decrepitate salt, of each one pound. Mix them together, and put in a retort of two quarts. Set the retort on the bare fire, or on the gradual sand fire. Let the beak of the retort be in the water, and at the bottom of that vessel, wherein the water is, you will find the running mercury of antimony.

XXV. *A magical mercurial ring.*

Take verdigrease half a pound, and an equal quantity of copperas. Pulverise each of them separately, and put these powders into an iron pan, which hath never been used before for any thing else. Boil the whole, for about two minutes, in very strong vinegar. Then throw into the pan half a pound of crude mercury, which you will incessantly stir with a wooden spatula. Begin to boil first by a slow fire, and never cease to stir the whole well, for fear of the adhesion of mercury. In proportion as the vinegar sinks, you may add more, not exceeding, however, the quantity of half a pint, or thereabouts. When this has boiled about a couple of hours, the matter will remain in a lump at the bottom of the pan. Let it cool with the small quantity of vinegar which shall remain after the ebullition, then throw it into a large pan of cold water. Handle this lump well in that water, in order to purge it from all the *munditiae*. Throw that first water away, and put clean water in, and do the same again and again, keeping handling the matter well in

in your waters, till the last remains clear as rock water. When your mercury is thus well fixed, put it in a clean piece of linen to take off the superfluous parts ; and what remains well fixed after this second trial, you must extend on a sheet of white paper, on which, having flattened it quickly, and cut as hastily, for fear it should grow too hard, into small bits of the form and size you like, you expose it to the dew of one night, from the evening to the morning, and then you will find it as hard as iron.

XXVI. *To melt the aforesaid mercury.*

Take Alexandrian tutty, and *terra merita*, of each half a pound, separately pulverised and mixed afterwards together. Stratify your bits of the above mercury, making the first and last *frata*, or beds, with the powders, and a little thicker than the others. Cover your crucible with another, and lute them so well that there should no chink remain, which you will examine well after having dried them in an oven. When perfectly dry, place your crucibles in a gold or blacksmith's furnace, and surround them well with live coals every way, by the sides, top and bottom, which you will make blasting for a quarter of an hour ; and push by strength of bellows during half an hour, then let them cool gradually in the fire till the next day ; when, taking off your crucible, you will find your matter turned into a gold colour. Throw it into a pan of water, and wash it well till the water remains clear. The whole being granulated, put in a small crucible with half an ounce of borax, and melt it as you would gold or silver, then throw in it an ingot. With this matter you will make your rings, in drawing this metal through the wiring bench, or otherwise.

XXVII. *The virtue of those rings.*

They stop the colds in the head, shew the disorders one may be affected with, particularly in those well known monthly diseases of women. At such times the ring turns of a dull red colour. They are also very useful in killing the worms in small children, if you make them boil in a varnished new pipkin, with a glass (or four ounces) of water, reduced to a third, and drank fasting.

XXVIII. A fixation of copper, which will be found to yield six ounces out of eight, on the test.

Take two ounces of fine pewter, which melt in a crucible, adding gradually to it, after it is melted, an equal quantity in weight of flour of sulphur. When all is calcinated, and while still a little warm, add again to it half an ounce of common purified mercury, stirring continually with a spatula, till the mercury disappears entirely. There will come a powder, of which if you project one, on four ounces of red copper in fusion, then stir and cast in ingots, you may obtain the promised advantage.

XXIX. To whiten copper so as to make very fine figures with it.

Take five parts of copper, which you will melt in a crucible, then throw in one part of zinc. As soon as the zinc is in it, take it off from the fire, and stir the matter a little with an iron rod, then cast it in the moulds of your figures. They will look like silver casted ones.

XXX. To give the finest colour of gold to copper, in order to make statues, or other works with it.

Take one pound of copper, melt it in a crucible, then throw in it one ounce of Alexandrian tility reduced into a subtile powder, and mixed with two ounces of bean-flour. Take care to keep stirring this matter, and to guard yourself against the fumes. After two hours of fusion, you will take this composition off, and wash it well, and put it again in the crucible with the same quantity as before of the same powders. When melted, for this second time, you may take it off, and cast it in the moulds you propose, and had prepared for it.

XXXI. To imitate tortoiseshell on copper.

Rub copper laminas over with oil of nuts, then dry them over a slow fire, supported by their extremities, upon small iron bars.

XXXII. To perform the same on horn.

Make a cold dissolution of auripigment in filtered lime water; then, lay some of this liquor with a brush on your comb or other horn work. Reiterate this, if you find it has not penetrated enough the first time, and turn it, to do the same the other side.

XXXIII. To soften metals:

Take saltpetre and camphire equal parts. Dissolve them in a lye made with two parts of oak-wood ashes and one of quick lime. Pass this solution through a filtering paper, and vaporise it over a slow fire in a glass vessel. There results a borax, which, thrown in metals while in fusion, softens them perfectly.

XXXIV. To wash brass figures over with silver.

Take one ounce of *aquafortis*. Dissolve in it over a moderate fire one drachm of good silver cut small, or granulated. This silver being wholly dissolved, take the vessel off from the fire, and throw in it as much white tartar as is required to absolve all the liquor. The rest is a paste with which you may rub over any work made of copper, and which will give it the white colour of silver.

XXXV. To operate the transmutation of iron into steel.

Take beech and willow, burn them together. When in coals, extinguish them, before they are consumed, with water, or rather, with chamber lye. Pound them well, and sift them through a very fine sieve. Then burn likewise ox horns, and prepare them the same way. Sift well also soot, vine ashes, burnt shoes ashes, and pomegranate shell powder, putting aside and separately each drug by itself, and mix them afterwards, when used, in the following proportions.—Coals twelve pounds; horns ten; shoes, vine, soot, and pomegranate, of each equal quantity, three pounds, all well mixed together. To make one hundred pounds weight of steel, there is required one hundred and twenty pounds weight of good, soft Spanish iron, not streaky; to which if you give the aforementioned

mentioned dose of the said powders, prepared as directed, and put to the fire, for the space of forty-eight hours, you will get the best steel which can be had.

XXXVI. Another receipt for the same.

1. Take one bushel of beech coals pulverised and sifted; alder's coals, thus prepared, one peck; vine ashes and soot, both well pulverised and sifted, equal parts, half a peck. Mix well these powders, and stratify your iron bars with them in a crucible well luted; then give a good fire for twenty-four hours.

N. B. Observe that you must take care to use new, and not floted wood, to make the said ashes.

2. If you want to have your steel white, you must add to all the above powders one peck of juniper-wood ashes.

3. If you want it purple, you must make a lexiuation of vine and shoes ashes, soot and garlick, well pounded, equal parts; and a sufficient quantity of water to make the said *bullitorium*, in which you will steep, cold, your iron bars before you cement them.

4. You must proportionate the quantity of windholes, in each kiln, to the quantity of bars, and of crucibles, for which you intend to fit it.

5. The *stratum super stratum* ought to be made an inch, or an inch and a half inch-thick of powder to each bed.—The bars ought to be ranged cross-way one over another; and large crucibles are to be preferred to small ones.—You must take care to have them so well luted, as not to allow the least air to find its way in; for there would result an intire miscarriage of the whole operation; and besides, your powder would hence lose all its virtue.—Should you likewise let it get air before you make use of it, it would become quite dead and flat. Therefore, you are cautioned to keep it always very closely confined, in well-stopped vessels, of whatever kind they may be.—That which comes off from the crucible, after the operation, is not worse for having been thus in use. It wants therefore, nothing but an additional supply of fresh powder joined to it, to make up what is lost, or diminished,

by

by the frequent handlings of it, in taking it out, and putting it in the crucibles again.

6. The kiln ought to be wide by the inferior part, and go narrowly towards the top, which must end in a conical form. By such means, the heat contracted becomes strong, and acts with infinitely more power.—Neither must you neglect to have it so constructed as to be provided with an ash-hole, or a place underneath wherein the ashes may fall; and several openings to let the wind escape.

+ *An estimate of the costs, and profits, of such an operation in France.*

The thousand weight of iron, in bars, flat on one side, costs about *sixty livres*. Two thousand being requisite, at a time, for one single operation, makes one hundred and *twenty livres*, or, *five pounds sterling*.

Ten crucibles this will employ; *ten livres*.

Powders for the two thousand; *forty livres*.

For two men to sit up, and watch, in order to keep up the fire; *four livres*.

To prepare the steel, after it is out of the crucible, and render it marketable; *twenty livres*.

All the expence amounts to *two hundred livres*, or *eight pounds eight, or, ten shillings sterling*, or thereabout. Iron, thus turned into steel, whether white or purple, comes on computation, to *two sols*, or *one penny*, a pound; which makes *one hundred livres per thousand weight*.—Thus, the two thousand weight, which may be made in the same kiln, every week, comes to *two hundred livres*.

If you sell your steel, on the footing of *six sols* per pound, there is clear profit *four hundred livres* a week; which, in a year, would make *20, 800 livres*.—Now you may, on this calculation, have as many kilns as you please; and each kiln may have a kilnful every week.

XXXVII. *To take immediately rust from iron.*

You must rub your iron with a piece of rag steeped into oil of tartar *per deliquium*.

XXXVIII. *To obtain good silver from pewter.*

1. Take quick lime made from rock or transparent pebbles, and one pound of common salt. With those two ingredients make a strong lye, which you will evaporate on the fire to the reduction of one third part of what it made before. Next, melt in a crucible two pounds of pewter, to which, after fusion, you will add one pound of *hæmatites*. The whole being well incorporated and melted, throw it in part of your aforesaid lye; and, when quite cold, melt it again, and throw it again into new lye, repeating the same process for seven different times, and using fresh lye, prepared as above, every time.

2. The next operation is to take one ounce of ammoniac salt, an equal quantity of borax, eight scruples of auripigment, reduce them into a very fine and subtile powder, and being mixed together, incorporate them into a paste with the whites of two new-laid eggs, and put all together with the pewter, ready prepared as before mentioned, in a crucible. When all is in fusion, continue the fire for one hour; then take off the crucible. There you will find your silver, fit to stand the test of all the assayers.

XXXIX. *To soften iron.*

Take half an ounce of tartar; two of common salt; and two and a half of verdigrease. Mix all together, and expose it in a poringer to the dew of nine nights running. This will turn into water, in which, when red-hot, you may kill your iron.

XL. *To melt iron so that it will spread under the hammer.*

Take equal quantities of lime, tartar, and alkali salt. Pour over it a sufficient quantity of cow-piss, to make a thick pap with it, which you will set a drying in the sun, or before the fire. Make an iron red-hot in the fire; then, plunge in that matter. You may afterwards melt it as you would silver; and then work it in the same way when cold.

XLI. *To*

XLI. To give iron a temper to cut porphyry.

Make your iron red hot, and plunge it in distilled water from nettles, acanthus, and *pilosella*, (or mouse-ears); or in the very juice pounded out from these plants.

XLII. To soften all sorts of metals.

Take sublimated mercury, euphorbium, borax, and ammoniac salt, of each equal parts pulverised. Project some of that powder over any metal, when in a state of fusion, and you will obtain the desired effect of making it soft.

XLIII. To soften a sophistic metal.

Take black soap and common salt, of each two ounces; human excrements dried and pulverised, four ounces; roch alum an equal quantity, and nitre salt, half an ounce. Incorporate all together in a pan, over the fire, with bullock's gall; keep stirring it till you feel no longer any saline particle. Then take off the pan from the fire, and let the composition cool. Of this you may throw some into the crucible in which your metal is in fusion.

XLIV. A good temper for arms.

Take tythimalus, or spurge; roots of wild horseradish, bryonia, and purflain, of each equal quantities. Pound all together, so that you may get at least one pound of juice. Add to this one pound of red haired child's water; saltpetre, alkaline, gem and ammoniac salts, of each one drachm. When you have mixed all well together in a glass vessel close stopped, bury it in the cellar, and let it there lie for twenty days. Then bring it up again, and put it in a retort, to which you will adapt and lute well its receiver, and begin to distil by a gradual fire. Now when you want to get arms of a good

temper, you have only to plunge them in this distilled liquor, after having previously made them red hot in the fire.

XLV. Another very hard temper.

Take nettle juice, bullock's gall, child's water, or strong vinegar, and a little salt. Incorporate well all this together, and plunge any red-hot iron in it.

XLVI. To melt iron and make it soft.

Take two pounds of auripigment; and four of oil of tartar. Make the auripigment soak up all the oil of tartar, and dry it up afterwards over a soft fire. Then put small bits of iron in a crucible; and, when very red, throw by little at a time, about half a pound of that auripigment prepared as before; and you will find your iron soft and white.

XLVII. To whiten iron like silver.

Melt iron filings in a crucible, along with realgar, or red arsenic. Then take one ounce of that matter, and one of copper; melt all together, and put it in a coppel. It will give you one ounce of good silver.

XLVIII. To render iron brittle, so as to pound like glass.

Take the distilled water from roch alum, plunge in it seven different times your pieces of iron, or steel, beaten very thin, and made red hot every time. This operation will render them so brittle, that you may pound them in a mortar afterwards, as you could glass.

XLIX. Ingredients which serve to the melting of iron.

Iron is to be melted with any of the following ingredients; *viz.* pewter, lead, marcasite, magnesia, auripigment, antimony, crown glass sulphur, ammoniac salt, citrine-mirobolans, green, or fresh pomegranate rinds, &c. &c.

L. To

L. *To melt or calcinate the blade of a sword without hurting the scabbard.*

You must drop into the scabbard of the sword some arsenic in powder, and squeeze over it some part of the juice of a lemon. Then replace the sword into its scabbard. In a quarter of an hour afterwards, or little more, you will see what a surprising effect this will have.

LI. *A spirit which will dissolve all sorts of stones.*

Take rye-flour, and make small balls with it, which you will dry ; then put them into a retort well luted, and place it over a gradual fire, to draw the spirits by distillation. Any stone whatever will dissolve in it.

LII. *To refine pewter.*

Take fine pewter, and put it into a crucible. When melted, project over it, at different times, some nitre, till it comes to a perfect calcination. Repeat this three times, pounding the matter into powder, which mix with charcoal dust. Being thus melted, it will resume its former substance of pewter, with this difference, that it will be refined to an infinitely superior degree.

LIII. *To fix mercury.*

Take verdigrease in powder, which put in a crucible. Make a hole in that powder, and place in it a knot of mercury previously impregnated with white of eggs water. Cover this knot over with borax, and add again over this some more verdigrease and pounded glass, one or two fingers deep. Lute well the lid of the crucible, and give a pretty smart fire, though gradually, and not at once, for the space of two hours.

LIV. *To extract mercury from lead.*

Take lead and beat it into sheets, or laminas, very fine. Put these in a glass vessel with common salts, a double quantity of the lead. Cover this well, and bury it under ground for nine days at least. After that time, if you

open the vessel again, you will find your lead turned all into running mercury, or quicksilver, at the bottom of it.

LV. The composition of cast mirrors and cylinders.

Take one pound and a half of red copper; eight ounces of refined pewter; one and a half of stellated mars-regulus, otherwise regulus of antimony; half an ounce of bismuth; one and a half of nitre, and a discretionable quantity (that is to say, as much as you please) of silver.

LVI. The composition of metallic mirrors, or looking-glasses, used among the ancients.

1. Take one pound of decapitated, or well purified, copper, which melt; then throw over it three pounds of refined pewter. As soon as they shall be both in good fusion, add six ounces of calcinated red tartar, two of arsenic, half an ounce of saltpetre, and two drachms of alum. Leave all this in fusion together, for the space of three or four hours, that all the salts may well evaporate, then cast this composition in the flat sand mould prepared for it.

2. To give these mirrors the requisite polish, proceed as follows. Take the coarsest part away with the wheel over a grinding stone, the same method as the pewterers and braziers do, and then smoothen them with water till they are sufficiently polished by attrition. Take the mirror from that wheel, and put it on the wooden one covered with leather, after having rubbed it well with emery, to give it a fine polish; then take it again from this wheel, and put it on another of the same kind, covered with leather, after having previously rubbed your mirror with prepared blood-stone, and washing it afterwards with magister of pewter. Take notice to make your mirrors observe, on both these last leathered wheels, the same oblique direction in turning them, and continue so long till the mirror has acquired a sufficient fineness and brightness.

Convex and ardent mirrors are rubbed and polished in the same manner.

LVII. To make convex and ardent mirrors.

1. Take one pound of copper in laminas. Cut them in small

small pieces to get them into a crucible, and impregnate them with oil of tartar. Then take a quarter of a pound of white arsenic in powder, stratify your laminas, putting bed upon bed till the crucible is full. Cover this crucible with a lid of the same earth; lute it well, and set it to dry. When done, plunge it to the lid in the sand, and give it a gradual fire, till it is strong enough to evaporate the oil. During that time the oil prepares the copper, in detaining the arsenic, and making it pass into it with the same facility as oil passes through leather. You may, if you choose, place your crucible in the furnace on the bare fire; but then you must manage the fire gradually, till the oil is quite evaporated. This being done, let the crucible cool, and break it; you will find your copper variegated with several colours, and it would be still more so, if, instead of arsenic, you had used auripigment.

2. Take of this copper one part, and two of brass. Melt first the brass on a blasting fire; then throw in your prepared copper. When they shall have been in good fusion, throw this metal into a pan full of lukewarm water, over which place a birch-room, to force your metal to granulate in falling through its twigs into the water. By such precaution, your metal will be so hard as to resist the file; will not be brittle; and acquire the same qualities as steel, instead of which you may employ it, for various sorts of works.

3. Now take of this hardened metal three parts; of the best Cornwall pewter, and perfectly free from lead, one part. Melt first the metal, as we said before, on a blasting fire, then put your pewter to it; and, when both are well melted together, throw this composition in the convex mould, to make the convex mirrors. This composition is the best which can be employed for the manufacturing of these sorts of mirrors. It is white, hard, never brittle, and susceptible of receiving the highest and most finished polish.

LVIII. *To give tools such a temper as will enable them to saw marble.*

Make the tool red hot in the fire; and, when red cherry colour, take it off from the fire, rub it with a

piece of candle, and steep it immediately in good strong vinegar, in which you shall haye diluted some foot.

LIX. To soften iron, and harden it afterwards more than it was before.

1. Make a little chink lengthways in an iron bar, in which pour melted lead. Then make it evaporate by a strong fire, as that for copelling. Renew this operation four or five times, and the bar will become very soft. You harden it afterwards in steeping it, when red hot, in mere forge water, and it will be of so good a temper, as to be fit for lancets, razors, and knives, with which you will be able to cut other iron, without its splitting or denting.

2. It has beeⁿ found, by experience, that an armour can never be good proof against fire arms, if it has not first been softened with oils, gums, wax, and other incendiative things, and afterwards hardened, by steeping them several times over in binding waters.

LX. The transmutation of iron into damask-steel.

You must first purge it of its usual brittleness; and, after having reduced it into filings, make it red hot in a crucible; steep it several times in oil of olives, in which you shall have before thrown several times melted lead. Take care to cover the vessel in which the oil is contained, every time you throw your steel into it, for fear the oil should catch fire.

LXI. To guard iron against rusting.

Warm your iron till you can no more touch it without burning yourself. Then rub it with new and clean white wax. Put it again to the fire, till it has soaked in the wax. When done, rub it over with a piece of serge, and this iron will never rust.

LXII. To cut pebbles with ease.

Boil it a good while in some mutton suet; and, then, you will cut it very easilly.

LXIII. To

LXIII. *To whiten copper.*

Take auripigment and egg shells calcinated, equal quantities. Put all together in a pot covered with another, having a little hole on the top. Give it first the wheel-fire for three hours. Increase the fire, and what shall have been sublimed, remix with the *faeces* again. Sublime anew, and mix again the *faeces* and the flowers together. Then, for the third time, there will be no more sublimation; only the flowers will swim over the *faeces*. Now take arsenic of one single sublimation, and crude tartar, of each equal parts, well mixed together, and stratify with this mixed powder some very thin copper laminas. Then push the fire with violence, to the degree of fusion, and granulate it in water, which you are to put in great agitation for a good while, before you throw the matter into it, in order to prevent thereby your matter from sparkling, when you throw it. In reiterating this operation on the same metal, you will render your copper as beautiful as silver.

LXIV. *A projection on copper.*

1. Take fine pewter two ounces, which you will melt in a crucible. When melted, throw in it by little at a time the same weight of flour of brimstone. Stir every time with a rod, till you see both your pewter and sulphur well calcinated. Then take the crucible out of the fire, and throw in half an ounce of crude mercury. Let it cool, and pulverise this.

2. Now melt four ounces of molten copper. When in good fusion, project on it, by degrees, one ounce of the above powder, stirring carefully, while you do it, with a stick. Leave it thus in fusion for a little while, and then you may use it for making all sorts of plates. It is so beautiful, that, if you test it on the coppel with lead, it will stand it perfectly.

LXV. *The preparations of emery.*

1. Calcine eastern, or Spanish emery, three or four times in the fire; then let it cool. Pound it and make *strata super strata* of it, with double the quantity of sulphur-vivum in powder. Leave this crucible in the furnace

with a strong fire during three or four hours. Repeat this process four different times over, then reduce your emery into an impalpable powder. Put it next into a matrass, pour over it regal water, that it swim over by three fingers deep. Put this in digestion for eight hours. Pour off by inclination your regal water, impregnated with the dye. Put new water on your matter, and set it on digesting again for eight other hours, as the former. Then take your thus tinged waters, which you will mix and put in a retort. Distil most part of it, till you see what remains in the retort is yellow. This is the true oil of emery, in which you will put the bigness of a filbert of camphire.

2. Exsulphurate in a crucible, on a good fire, and during two hours, what quantity you please of arsenic. Then take two ounces of the aforesaid oil of emery, one of your exsulphurated arsenic, an equal quantity of salt of tartar drawn with distilled vinegar, two of sublimate, and two of silver; which you will have dissolved in an aqua fortis made with nitre and vitriol. Put all together in a matrass, so large that the composition should occupy no more than a third part of it, and of which you shall have cut the neck off, to obtain a more easy evaporation of the compounds from it. Put this matrass in the sand as high as the matter, and give it a moderate fire for two hours, then a strong one for six; let the fire go out of itself. Then you will find your matter in a stone in the matrass. Take it out, and pound it into powder, projected upon another ounce of salt in fusion; if you keep it a little while in that state, and throw it afterwards into oil of olives, will increase your gold by a third of its primary quantity, and rather more: And you may thus increase it again and again, by repeating the same operation.

LXVI. *A factitious amiant; or way to make an incom-bustible cloth.*

Take rotten oak-wood, which you will calcine into ashes, and mix with an equal quantity of pearl ashes. Boil all together in ten times its weight of water. When this has boiled one hour, add as much water to it as there may have been evaporated, and boil now in it

it a large stick of *alumen plumosum*, during one hour. Take off the vessel from the fire, and carry it into the cellar. In a month's time you will find your alum as soft as flax. Spin it, and get it weaved into a cloth. The fire will never have any power over it. On the contrary, the best way to wash it is to throw it on red-hot coals; and after having there let it burn throughout, take it off, and you will find it perfectly clean.

LXVII. *To render tartar fusible and penetrating.*

1. Stratify cakes of white tartar with vine branches. When done, set them on fire by the top, and when arrived at the bottom, your tartar will be calcined.

2. Dissolve this calcined tartar in *aquavitæ*, then pass it through the filtering paper, and next evaporate the brandy. What shall remain is the salt of tartar, which you must find to be as white as snow. Pour over it the best French spirit of wine, so that it should exceed over the salt the thickness of an inch. Set it on fire. As soon as your spirit of wine shall be all consumed, your salt of tartar will be fusible and penetrating.

3. Now should you make any iron red-hot, and project on it a little of that salt, it will penetrate it through and through, and leave after it a vestige as white as silver, in the place where it touched.

LXVIII. *To extract mercury from any metal.*

1. Dissolve lead, antimony, or any other metal, in good common *aqua fortis*. When that water shall have dissolved as much of it as it can, pour it out by inclination, and on what shall not be quite dissolved, but corroded only in a white powder, pour some hot water. Shake then the matras in which the metal is, and you will find that the water will finish to dissolve what the *aqua fortis* could not. Next pass it through a filtering paper; and what will not pass, dissolve in fresh *aqua fortis*. Continue thus the same dissolving process, till you have obtained a perfect dissolution of all the powder, and you have made it pass through the filtering paper. Now take all your several dissolutions, make a precipitation of that dissolution to the bottom of the vessel, in

form of white curds, by means of a water impregnated with salt. Edulcorate this twice, with cold common water, and once with some a little warm, then dry it.

2. Take one ounce of that dissolution, thus edulcorated and exsiccated into powder; half an ounce of ammoniac salt sublimed over common salt. Grind all together on a marble stone with a mullar, that it may be well incorporated, as the painters do their colours; and, to succeed better in that incorporation, impregnate it with distilled vinegar. Now put all this into a pan, and pour cold water over it, so that it should swim over the matter, stir it well twice a day with a stick, for three weeks. Then take quick lime, which you will slack with the swimming liquor which covers your matter; and with equal quantities of the powder which lies under it, and the slackened lime, make small bullets, which put into a retort well luted, and push it on with a great fire. You will soon see the mercury going into the receiver, which you must have had the precaution of filling with water, and under which, at the bottom, you will find it.

3. The same process carefully attended to, may procure you mercury from all the metals and minerals without exception.

LXIX. To dye in gold silver medals, or laminas, through and through.

1. This curious operation is performed by means of the admirable salt of *Glauber*, which is made with nitre and vitriol oil, in the following manner.—Take what quantity you please of nitre salt, pour over it a sufficient quantity of oil of vitriol, to swim over. When the ebullitions arising from that mixture shall be ended, distil to dryness; there remains a white salt, known under the name of salt of *Glauber*.

2. Dissolve in what quantity of warm water you think proper, or be in need of, a sufficient quantity of that salt as may saturate it, which you know, when you see the water can dissolve no more of it. In this dissolution put a drachm of calx, or magister of gold. Then put in digestion in it silver laminas, cut small and thin, for twenty-four hours, over a very gentle fire. At the end of that

that term you will find them thoroughly dyed gold colour, inside and outside.

LXX. *To make a perpetual motion.*

Take *aqua-fortis*, in which throw some steel filings, well dried. Leave this mixture to lay for six or eight hours. Then pour out the *aqua-fortis* in another bottle, in which you will throw a small loadstone of good quality, and stop it well that no air get in. You will observe a perpetual motion.

LXXI. *A secret fire.*

Have a barrel open by one end, and pierced with a dozen of holes on the other. Put in it three or four bushels of oat-straw, cut very fine, as that which is given to horses. Get next half a bushel of barley, which have soaked for three days in lime water, and drained in a sheer-cloth of all the water which can run out of it. Place this wet barley in a lump over the oat straw, then cover it with other similar cut straw, and let it rest, when you thrust your hand in it, you feel it warm. This heat you may keep up, by throwing, with a gardener's watering-pot, about half a pint of water every other day.

LXXII. *An oil, one ounce of which will last longer than one pound of any other.*

Take fresh butter, quick lime, crude tartar, and common salt, of each equal parts, pound and mix together. Saturate it with good brandy, and distil it in a retort, over a graduated fire, after having adapted the receiver, and luted well the joints.

LXXIII. *To make a coppel with ashes.*

Take equal parts of the ashes resulting from vine branches, mutton bones, and harts horns, burnt and calcined. Moisten them with a little common water, then press them very hard in a mould called *coppel*. Then take ashes from the jaws and teeth of a jack, put over the other ashes

ashes to the thickness of a crown piece, pounding well these also over the others, as hard as you can. These last ashes serve to set off clean the grain of the metals you are testing on them. The harts horn ashes serve to bind, or unite, those of vine branches and mutton bones together, and to draw down at the same time the lead. You must use eight times as much lead as the composition you want to test by the *coppel* weighs.

LXXIV. *To solder iron, or any other metal, without fire.*

1. Take one ounce of ammoniac, and one of common salts; an equal quantity of calcined tartar, and as much of bell-metal, with three ounces of antimony. Pound all together and sift it. Put this into a piece of linen, and inclose it well all round with fuller's earth, about one inch thick. Let it dry, then put it between two crucibles, over a slow fire, to get heat by degrees. Push on the fire till the lump contained in the crucibles becomes quite red hot, and melt all together. Then let the vessels, and the whole, cool gradually, and pound it into powder.

2. When you want to solder any thing, put the two pieces you want to join on a table, approaching their extremities as near as you can one to another. Make a crust of fuller's earth so, that holding to each piece, and passing under the joint, it should be open over it on the top. Then throw some of your powder between and over the joint. Have again some borax, which put into hot wine till this is consumed, and with a feather rub your powder at the place of the joint; you will see it immediately boiling. As soon as the boiling stops, the consolidation is made. If there be any roughness, you must smoothen it, by rubbing with a grinding stone, for the file will have no power over it.

LXXV. *To solder with fire.*

Make a paste with pulverised chalk and gum water, which put around the two broken pieces placed on a table, and prepared as before-mentioned in the preceding receipt. The only difference is, that you are to rub over the two united extremities with melted soap; and, after having thrown some of the above powder at the place of the joint, hold

hold a kindled piece of charcoal over it. This will immediately set the matter in fusion, which is no sooner done but you may take off the paste, and you will find it consolidated.

LXXVI. *To make borax.*

Take two ounces of roch-alum, dilute it, and mix it with two ounces of alkaline salt, which is used in making of glass. Put all into a pewter pot, and set it a-doing, for the space of half an hour, over a gentle fire; then take it out of the water. Take next two ounces of gem salt in powder, as much of alkaline salt, two pounds of virgin honey, and one of cow milk. Mix well all together, and set it in the sun for three days. Then the *borax* is done.

LXXVII. *To render iron as white and beautiful as silver.*

Take ammoniac salt in powder, and mix it with an equal quantity of quick lime. Put them all together into cold water, and mix well. When done, any iron piece, which you shall have made red hot, will, if you sleep it in that prepared water, become as white as silver.

LXXVIII. *To calcine pewter, and render it as white and hard as silver.*

Melt well your pewter in a crucible, so that it may be very fine and clear. Pour it afterwards into a very strong vinegar, then into mercurial water. Repeat that operation as many times as you please, you will each time give it an additional degree of hardness and whiteness, drawing near to silver; so much, that it will at last be very difficult to distinguish it from silver itself.

LXXIX. *Another to the same purpose.*

Make a good lye with vine branch ashes and vinegar. Throw in your pewter when in fusion. Repeat this, seven different times. —— Have next some new goat's milk, in which you shall have added some white arsenic in powder. Melt your pewter again; then throw it in this preparation. Repeat twelve times the same, and the pewter will become as hard and as white as silver.

LXXX. *To whiten brass.*

1. Take rosin and saltpetre, equal quantities. Pound all in a mortar, and reduce it into an impalpable powder. Put this into an earthen pan made red hot, and thus burn the matter. As soon as done, you must wash and dry it, then grind it again as before, with the addition of an equal quantity of auripigment. Then put all this into a crucible, cover it with another well luted, and having a little hole in the top, which you will stop by laying only a medal on it. When calcined, take what you will find clear in the bottom, not what will have sublimed on the top. Make a very fine powder of this matter; and, with *one* single ounce of that powder, you will be able to whiten two pounds of brass, in proceeding about it as follows.

2. Melt first your brass as usual; and, when in good fusion, cast it into very good vinegar; an operation which you must repeat three times. Then, when you melt it for the fourth time, you are to project on it, as we said before, *one* ounce only (if you have two pounds of brass) of the said powder, which will render your brass as white as silver.—*N. B.* To melt the brass with more facility, throw in the crucible a certain discretionary quantity of mice-dung.

LXXXI. *Another method.*

Brass, copper, iron or steel, may also be easily whitened by means of the butter from Cornwall tin, or pewter, prepared with sublimate, proceeding as follows.

Take Cornwall pewter, about one pound; add to it half that quantity of sublimate. Set it on a strong fire, and sublime. Throw away the first water. The second is good, which you know by its white colour. Now, if you make a piece of copper, brass, steel, or iron, it does not signify which, red hot, and steep it in that water, it will become as white as silver.

LXXXII. *To extract gold from silver.*

1. Melt whatever quantity you please of lead, in a crucible, over a fire of clear and bright live-coals. Have at the same time in fusion an equal quantity of sulphur. Then

Then take your first crucible, in which the lead is melted, off from the fire; and, before the lead shall congeal, throw in the same quantity in weight of quicksilver. Stir and mix well this with a stick. When this is done, pour your sulphur, from the other crucible, over the mixture of lead and quicksilver you have just made, and which coagulates, continually stirring carefully the matter with a spatula, for fear the sulphur should blaze and be consumed, before it is all poured in. When the whole is come quite cold, grind it on a marble table with a muller. Then put all again into a crucible over the fire, and leave it in fusion till all the sulphur is burnt out, and the matter be fluid enough to be cast in an ingot. This will look like the regulus of melted antimony. It will have even its brittleness.

2. Reduce this composition into powder, and, with an equal quantity in weight of it and of silver laminas, make *strata super strata* of them, alternately, in a crucible, beginning and ending always with the powder. Then, over the last bed, put about half an inch thick of Venetian glass, or crystal, reduced into an impalpable powder. Observe however that the crucible should not be filled so near the brim as to let the glass boil over. Make a fire strong enough to melt both the matters and the glass; and set them thus in fusion all together for an hour at least. Then take off, and let cool, your regulus; in breaking your crucible, make a coppel, or test, in which you will put lead in fusion, till it is as fluid as it can be. Throw in your regulus to purify it by that test, in the same manner as silversmiths do. — When your silver shall be fallen to the bottom very pure, put it in laminas, or granulate it; then put it to dissolve in *aqua fortis*. You will see some small particles of fine gold precipitating from it, in the form of black powder. Wash these in warm water; then put them in fusion, in a crucible, and you will have true pieces of good gold, fit for any of the chymical physics, and capable to stand any test.

C H A P. III.

SECRETS for the Composition of
VARNISHES, &c.I. *A gold varnish.*

TAKE karabe, or amber, eight ounces, and two of gum-lac. Melt first the karabe, in a varnished earthen pot, or in the retort of an alembic, over a very strong fire. When this is melted, throw in the gum-lac, and let this melt in the same manner. Then take some of the fire off, and let it cool; observing with a stick, whether the matter has got all its fluidity. Mix in it six or eight ounces of turpentine oil. Keep stirring, in order to incorporate well this oil with the rest. Add also a spoonful of lintseed oil, prepared with *hepatica-aloes*, which, in order to reduce to the thickness of a syrup, mix with a sufficient quantity of oil of turpentine, tinged with *rocou*.

II. *How to prepare the lintseed oil with the hepatica-aloes, for the above purpose.*

Prepare the lintseed oil with *hepatica-aloes*, by mixing four ounces of this in powder, with one pound of the said oil, over the fire, till it has acquired the consistence of a very thick syrup, and you see your oil beginning to scum, and to swell much. Then pass it through a piece of linen, let it cool, and bottle it, to keep for the above-mentioned use.

III. *To draw the tincture of rocou used in the composition of the above varnish.*

In order to draw the tincture of *rocou*, put four ounces of

of it in oil of turpentine. Set this over a gentle fire, in the retort of an alembic; and, as soon as the oil begins to boil, take it off from the fire; stir well with a stick, and filter it through a paper, to use it as directed before.

IV. *A varnish for icing.*

Concoct some turpentine with water, and white wine, or brandy. When concocted, dissolve it in wine and oil of turpentine.

V. *An excellent varnish.*

Take what quantity you please of verdigrease, grind it with vinegar, put in a piece of dough, as you would an apple to make a dumpling. Bake it in an oven as bread; then cut open your dumpling, and get the verdigrease out of it. Mix it with wine, and use it. Lay over it a coat of four ounces of gum arabic; then polish as usual. You will find it will answer your expectation, and be a very fine varnish.

VI. *For colouring and preserving gates, poles, barns, &c.*

Melt twelve ounces of rosin into an iron pot, or kettle; add three gallons of train oil, and three or four rolls of brimstone. When the rosin and brimstone are melted and become thin, add as much Spanish brown, or red or yellow oker (or any other colour you want, ground fine, as usual with oil) as will give the whole as deep a shade as you like. Then lay it on a brush as hot and as thin as you can. Some days after the first coat is dried, give it a second. It is well attested, that this will preserve plank for ages.

VII. *A red varnish.*

1. Take three ounces of gum-lac; half an ounce of sandarak; as much of mastich in drop, and a pint of French spirit of wine. Put all in a matraff, which you must take care to lute well with potter's clay, and stop with paper. Have a large iron kettle, two parts of which shall be filled with sand. Place the kettle over the coals, and lay the matraff on the sand. Get the composition to boil

boil in that situation for three hours. Strain it through a sheercloth ; bottle and stop it well, and keep it for use.

2. To make this varnish red, you put one ounce of vermillion to six of the said varnish. But to dilute the vermillion, you must begin by pouring, first, some oil of a pic over it, and then the six ounces of varnish, which will take near a quarter of an hour to mix well together.

3. Observe that the wood on which you want to lay it, has been first well polished. Rub it again besides with a pounce stone and vinegar, that all the pores may be well filled, and should appear no more. Then lay with a brush, first a coat of simple varnish, without vermillion. Let this dry ; put on next your second coat, of that which is prepared with the vermillion ; then a third and a fourth, according as you want it of a more or less deep red.

VIII. A black varnish.

1. Take gum-lac, four ounces; sandarak and black rosin, equal quantities, one ounce of each. Pulverise all separately, and keep them distinct, to proceed afterwards in their mixture according to the following directions. Dissolve the rosin over the fire in a sufficient quantity of spirit of wine ; then add the sandarak to it. As soon as this is also dissolved, add the powder of gum-lac, and stir well till all is melted together. Strain it, while warm, through a cloth. If any thing remain in the linen afterwards, add some more spirit of wine, to dissolve it as before ; and strain it again.

2. The black colour is given to it by means of *two drachms* only of ivory black to every *two ounces*.

IX. To make ivory-black for the above purpose.

Burn any quantity of ivory you please, in the fire, till it is black. Put it into powder on a stone of porphyry. Add some water to it, and make a paste, which you let dry. Then grind it again, as before, with spirit of wine.

X. A varnish for floors.

Put a little petroly or rock-oil with varnish and turpentine, and stir well. Lay it on your floors with an old hair

hair broom, after having mixed in it the colour you want them to be.

XI. *A varnish from Flanders.*

Take æthereal oil of turpentine, and Venice turpentine, equal parts. Mix them over a moderate fire, and use this boiling.

XII. *A varnish to lay on canvass sashes.*

Take fine and clear turpentine, four ounces; oil of nuts, two. Melt all together over a fire; and when it begins to boil, scum it, and use it hot with a brush.

XIII. *A varnish of shell-lac, for pictures.*

1. Take spirit of wine, one pound; pickled shell-lac, five ounces; sandarak, two and a half; white karabe and mastick, equal parts, two drachms of each.

2. First boil and skim the shell-lac and sandarak together, to have them the whiter. Then add the mastick and karabe to that, and put all in a matrass over a sand fire, to digest and concoct together by a gentle heat.

XIV. *Another varnish for pictures.*

Take four ounces of gum arabic, the clearest and whitest you can find. Put it to infuse in a pound of water, over ember ashes, for one night. Strain it in the morning through a cloth, after having added to it the bulk of a nut of Narbonne-honey, and half that quantity of sugar candy. It is not to be used with a brush.

XV. *Another sort.*

Take aquavite, sugar-candy, and whites of eggs, a reasonable quantity of each. Beat all well together to a froth. Underneath is a liquor; that is your varnish. You may lay it with a soft brush on any sort of picture.

XVI. *The Chinese varnish.*

1. Take pulverised and sifted sealing wax, two ounces. Put it in a matrass, with four ounces of turpentine oil.

Give

Give a gentle fire, that all may melt. If the wax be red, you need add nothing but the oil. If black, some lamp-black is requisite to be added still. And, with this first composition, you lay on the first coat.

2. Next to this have aloes and karabe, of each two ounces. Dissolve this in a varnished pipkin, along with twelve ounces of lintseed oil, till all is well incorporated. There will fall a ground to the bottom, over which will swim a very fine and transparent liquor. Of this you are to make your second coat of varnish, laying it over the other after it is dry.

XVII. *To imitate jasper, or variegated black marble.*

Take *sulphur-vivum*, quick lime, *aquafortis*, and the green rind of walnuts, one ounce of each. Dilute all together; then lay it with a brush on what you want to be jaspered, whether a column, a table, or any thing else. This done, put your table or column, &c. thus blackened, in a dunghill, for the space of twelve days, and then take it out again. You will find it well veined and variegated. To give it a fine gloss, rub it with a varnish composed as prescribed hereafter. See Art. xix.

XVIII. *Another way.*

Make a large ball, with the drugs prescribed in the above receipt, to compose your black. Lay it for a week in a dunghill. When by that means it is well variegated, rub your intended piece of furniture with it.

XIX. *An excellent varnish to give a fine gloss to jasper, or variegated black marble.*

Take oil of spikenard, three ounces; sandarak, well picked and clean, two. Have a new earthen pot well glazed. Set it before the fire a warming, without any thing in it. When hot, throw in it one half of the sandarak, and one half of the oil. Stir well, lest it should burn, or stick to the pot. When it is nearly melted, throw in the remainder of the oil and sandarak. When all is well dissolved and mixed, add a piece of camphire, to take away the bad smell of this composition, and let it dissolve;

dissolve; then bottle and stop it for use. It requires to be used hot.

XX. A varnish which dries in two hours time.

Melt four ounces of yellow amber, in a new earthen pan, over kindled coals. Take care, in that operation, that the fire should but just reach, and touch, the bottom of the pan, and none should rise along the sides. Never cease to stir, from the moment it is melted, with a deal stick, and add directly one ounce of sealing-wax. As soon as this is also melted, add half an ounce of lintseed oil, previously thickened with a little gold litharge; then take it off from the fire, and stir it as before. When the matter begins to be a little cold, then is the time of adding what quantity of turpentine oil you find necessary.

XXI. A varnish for copperplate prints.

Prepare water with some ifinglass. Lay, with a very soft brush, a coat of this on the print. Next to this, lay another of the following varnish—True French spirit of wine, half-a-pound; gum-elemi, two drachms; and sandarak, three.

XXII. An admirable varnish.

Take white mastick and lintseed oil, what quantity you please; a little turpentine, pounded glafs, burnt verdi-grease, and pounded amber. Boil and melt all together in a new earthen pot. When done, you will find it to be an admirable varnish.

XXIII. A varnish fit to lay on all sorts of colours.

Take one ounce of white amber; half an ounce of spirit of turpentine; four ounces of rectified spirit of wine (the true French sort); one drachm of mastick, and as much of juniper gum. Put all together to infuse for eight days. Evaporate two parts of it over a gentle fire. What remains is a varnish fit for laying on all sorts of colours, and which will hurt, spoil, or damage none.

XXIV. A

XXIV. *A varnish known under the appellation of Beaume-blanc, or white balm.*

Take spirit of wine, four ounces; gum-lac, half an ounce; sandarak, two drachms; mastick, one. Pulverise the ingredients, and put them, with the spirit of wine, in a square bottle, large enough to be but half full after the whole is in it. Dissolve this over a slow fire, and take care the bottle be well stopped.

XXV. *A varnish to be used on plaster, and any sort of materials.*

To the varnish of copal and spirit of wine, only add some calcined talk.

XXVI. *An excellent varnish, in which may be put, and diluted, whatever colour you like.—It suits, equally well, goldsmiths and limners.*

Take aspic and turpentine oils, of each one ounce; clean picked sandarak pulverised, four drachms; gum copal, two. The whole being well pulverised, put it along with your oils in a matraff, with the addition of half a pound of spirit of wine; and set it in a *balneo marie*. When the matter is dissolved, strain and keep it for use, in a glass bottle well stopped.

XXVII. *A Chinese varnish suitable to all the sorts of colours.*

1. Take one ounce of white amber; one quarter of an ounce of sandarak; as much of gum copal. Pound these together, and put them in a matraff perfectly dry. To every ounce pounded and mixed thus together, put three ounces of spirit of wine. Stop well the matraff with a rag, some paste made with flour, and then another rag, well tied over. Boil the varnish thus, over ember ashes, till the whole is dissolved: apply it as follows.

2. The piece intended for varnishing being previously well polished, you lay on it the proposed colour or colours, diluted in *aqua vitæ*, with some isinglass. When these are dry, pass on them two or three coats, according to discretion; allowing proper time between each coat of varnish

varnish to dry; and when dry, polish it with olive oil and tripoly, then rub the oil with a rag.

Note. If you intend this varnish for miniature pictures, you are to make an addition of equal parts of gum copal and white amber.

XXVIII. Chinese varnish, particularly calculated for miniature painting.

Take one ounce of white karabe, or amber; and one drachm of camphire, reduced into a subtile powder, and put in a matras, with five ounces of spirit of wine. Set it in the sun to infuse, during the hottest days, stir it two or three times a-day. After a fortnight's infusing thus, put the matras, for one hour, over hot ashes; then pass all through a cloth, and keep it in a bottle well corked.

XXIX. How to make a red, with varnish, of a much higher hue than coral itself.

Take Spanish vermillion, grind it on a marble with brandy, and add to it the fifth or eighth part of lac. When done, mix this composition with as much varnish as you may find it requisite to apply.

XXX. To make it gridelin colour.

Dilute with your varnish some blue verditure, lake, and whitening.

XXXI. To make it green.

Substitute for the above ingredients German green verditure, pewter in grain, and white lead.

XXXII. Another way for the same.

Grind, with water, on a marble stone, the finest orpine you can find, and a little indigo. Let it dry, then pound and mix it with varnish.

XXXIII. To make it yellow.

Take some Naples yellow, and mix it well with your varnish; then use it.

XXXIV. *To make it blue.*

Take ultramarine, lake, and whitening, and proceed as ordered in the other receipts abovementioned.

XXXV. *Another sort of varnish.*

Take shell-lac, in grains, two ounces; two of sandarac; black rosin, two drachms; and spirit of wine, one quarter. Dissolve and prepare the whole as above.

XXXVI. *A transparent varnish fit for all sorts of colours.*

Take oil of nuts, and a little of the finest Venice turpentine. Boil them together. Add a little brandy to it, and boil it also. Should the varnish prove too thick, thin it with an additional quantity of oil. Make use of a very soft brush, and lay it carefully over the colours.

XXXVII. *To make sashes with cloth which will be very transparent.*

Take fine white cloth; the finer, the more transparent the sashes will be. Fix the cloth very tight on a frame. Then make some starch with flour of rice, and lay a coat of it, as smooth as you can, on both sides your cloth, with a stiff brush; let it dry. Then the following varnish, with a soft brush, having care to lay it on as equally as possible.

XXXVIII. *The varnish fit for the above sashes.*

1. Take of the finest and whitest wax you can find, six pounds; of the finest and clearest Venice turpentine, two; one and a half of the most perfect lintseed oil. Have a new and varnished pipkin, larger, at least by one third, than is requisite to contain all these ingredients. Put, first, in this pot, the lintseed and turpentine oils together, and set it over a small charcoal fire.

When this begins to be a little warm, put in the wax, cut in small bits, and take care to mix all well with a clean stick, till the wax is thoroughly incorporated with the rest.

2. Now, take the pot off from the fire; and, while this composition is still a little warm, give a coat of it on both

both sides, prepared as before directed, and let it dry in the shade.

Note. You may render your sashes still more transparent, if, on both sides of them, you lay a smooth coat of the following varnish, with a soft brush:

XXXIX. *A fine white varnish.*

Take one pound of fine Venice turpentine, and as much of spirit of turpentine. Put this in a glass matrass, larger, at least by a third, than is wanted to contain the matter. Stop this matrass with another smaller matrass, the neck of which is to enter into that of the former. Have care to lute well both necks together, with paste and paper; and, when the luting has acquired a perfect dryness, set the first matrass on a sand bath, then set the varnish a-boiling, for near an hour, after which, take it off from the fire, and let it cool. When cold, bottle and stop it for use.

Note. Turpentine, well purified from all its greasy parts, is the best, and fittest to make the varnish for sashes.

XL. *A varnish to prevent the rays of the sun from passing through the panes of window-glasses.*

Pound gum adragant into powder, and put it to dissolve, for twenty-four hours, in whites of eggs, well beaten. Lay a coat of this on the panes of your windows, with a soft brush, and let it dry.

XLI. *To raise a relief on varnish.*

1. Dissolve one ounce and a half of gum arabic in two pounds of water. Grind with it bol armeniac and whitening, on a porphyry stone, till all is well united and incorporated. With this composition, fill up the vacancies between the outlines of your design, and form, as it is proper, the various reliefs, with the suitable proportions, and according to the sorts of things you are to imitate or represent. Then smooth the parts, and let it dry.

2. Next have ready prepared, in shells, the different sorts of metals which you want to use, diluted with gum-water; and, with a pencil, cover what places you are to

cover. When this is also dry, burnish it skilfully with an ivory tooth, and lay a coat of clear varnish over the whole. A moderate heat is required for a moment, to help that varnish to dry.

XLII. *To render silk stuffs transparent, after the Chinese manner; and paint them with transparent colours likewise, in imitation of the India manufactured silks.*

Take two pounds of oil of turpentine, very clear; add to it two ounces of mastic in grain, and the bulk of a filbert of camphire. Let this dissolve by a gentle heat; then strain it through a cloth. Of this oil lay one coat, or two, on both sides of your stuff. Allow, however, a sufficient time between each coat, for each to dry, and let the second lie two days on, before you touch the stuff again. When that time is over, draw the outlines of your design, and flowers, &c. cover this with a preparation of lamp-black and gum-water. Then fill the intervals with the intended and proper colours, suitable to the purpose, and which ought to be all transparent colours, diluted with a clear varnish. When this is done, and dry, lay on both the right and wrong sides of the stuff another coat of clear varnish.

XLIII. *To make a transparent blue hue, for the above purpose.*

Take nine drachms of ammoniac salt; six of verdigrease, distilled and exsiccated. Put both these into powder. Dilute these powders with tortoise oil. Put this on a very thick glass, which stop well, and set over hot ashes for a week. After that time your colour will be fit for use, and make your drawings with the clear varnish, as directed in the preceding article.

XLIV. *To make a transparent yellow hue, for the same use.*

Take a new-laid egg of that very day, make a hole in the shell, to draw the white out of it. Replace, by the same hole, with the yolk, two drachms of quicksilver, and as much of ammoniac salt; then stop the hole with wax. Set that egg in hot dung, or over a lamp fire, for

four or five and twenty days. When that time is over, break the egg, and you will find a very fine transparent yellow, fit for the use abovementioned.

XLV. To make a transparent green.

Take verdigrease, gold litharge, and quicksilver, equal parts. Grind the whole in a mortar, with the urine of a child. Put it next into a bottle, and set it over a gentle and slow fire, for the space of seven or eight days. This composition will give a very fine transparent green, for the above purpose.

Note. We have given, in the Sixth Chapter, several receipts for the composition of sundry transparent colours. We shall therefore take the liberty thither to refer the reader, for more ample satisfaction, and the completion of the abovementioned operation.

XLVI. To give the abovementioned painted silks all the smell and fragrancy of the India ones.

It is well known, that the silks, and other things, we receive from India, are all tainted with a certain particular smell, and agreeable fragrancy, which being their peculiar, distinctive, and most obvious character, if not imitated also, would help not a little in ruining the deception intended by the above labour. To imitate therefore, even this, you must observe the following direction. — Have a small closet, if it be for works at large; or, only a fine basket with a top to it, playing upon hinges, stuffed and lined all over in the inside, if it be for one single piece of silk. Put in either of them, and according to their extent, a proportionable quantity of cloves, whole pepper, mace, nutmeg, all-spice, camphire, &c. &c. Put your works among those ingredients, and keep either the closet, or the basket, perfectly close shut, till you see they have received a full impression from the odour of those ingredients.

N. B. With the various compositions of varnishes, and preparations of colours, we have just given, there is almost no sort of works, coming from the Indies, but can be performed and imitated.

XLVII. *The true receipt of the English varnish, such as is laid on sticks and artificial made canes.*

Smoothen and polish well your sticks; then rub them, or your artificial made canes, with a paste made of flour. Then, having diluted, in water, a discretionary quantity of Flemish glue, and red orpine, give one coat of this, very smooth and equal, to your sticks. If, after this is dry, you do not think it sufficient, give them another, and let them dry. Then, give them a third coat, of clear varnish, made with turpentine and spirit of wine. After this is done, put a-soaking, in an equal quantity of water and chamber-lye, some turnfol, cut very small. With this colour you touch your sticks, or canes, here and there, with a hair brush. Then holding them perpendicular, on their small ends, between both your hands, you roll them quick and brisk (as when you mill chocolate) in contrary senses. This operation gives them a negligent and natural-like marbling, over which you are to lay another coat of varnish, and set them to dry.

XLVIII. *A fine varnish for all sorts of colours.*

1. Take two pounds of double rectified spirit of wine; seed-lac, four ounces; sandarak, as much; gum copal, one. Set all a dissolving, on hot ashes, in a matrass, or a vessel with a long neck. When perfectly dissolved, strain it through a jelly-bag, made of new cloth. Mix, with that which shall have strained out of the bag, one spoonful of oil of turpentine; then bottle and stop it well, and set it in the sun. There will happen a separation, and a certain coarser part will shew itself at the bottom, while another more clear will appear swimming on the top. Divide carefully, by inclination, the clearest from the thickest part.

2. This last you may use with fine lamp-black, well picked, and free from all sorts of hard knobs, to make a black-colour varnish. With it you rub whatever you want to be varnished, and lay one, two, or three coats of it, more or less, according as you think proper, letting dry between each coat. And, when this is done, you put,

of the first separated clear part of your varnish, as much as you find requisite to give your work a fine lustre.

N. B. It is proper there should be some fire, so near to the work, as it may receive from it some gentle heat, while all this is performing; and when the whole is well executed, you must let dry in the shade what is varnished, and guard it against the dust.

3. If, instead of black, you want a red colour, you must, from the very beginning of the operation, join some tacamahaca-gum with the spirit of wine of double rectification abovementioned; and, in lieu of lamp-black, in the second part of the operation, you put some cinnabar in powder. Then, when you have done with laying the several coats of varnish, in which the cinnabar is, you put in the clear varnish, which is destined to make the last coats, for lustring, some dragon's blood in tears.

4. You may put, in the same manner, whitening in your varnish, if you want it white; or verdigrease, if you want it green; and so on any other colour you want it to be, proceeding, in respect to each of them, as before directed for the others.

N. B. These varnishes, when dry, do all require to be polished. For that purpose, take a cloth, dip it in tri-poly, and rub, with moderation, over the last coat of varnish, till you find it has acquired a sufficient degree of lustre and equality.

XLIX. *A varnish to lay on, after the ifinglass.*

Take spirit of wine, four pounds; white amber, fourteen ounces; mastich, one; sandarak, seven. Put all in digestion, for twenty-four hours. Then, set the matrasse on the sand, and give the fire for three hours, till all is perfectly dissolved. Add after, four ounces of turpentine oil.

L. *A varnish to gild with, without gold.*

Take half a pint of spirit of wine, in which dissolve one drachm of saffron, and half a drachm of dragon's blood, both previously well pulverised together. Add this to a certain quantity of shell-lac varnish, and set it on the fire, with two drachms of *soccotrine-aloes*.

LI. *A varnish water proof.*

1. Take lintseed oil, the purest you can find, put it in a well glazed pipkin, over red-hot charcoals, in a chafing-dish. With that oil add, while a-warming, about the fourth part of its weight of rosin. Make all dissolve together, and boil gently, lest it should run over the pot. At first, the oil will turn all into a scum; but, continuing to let it boil, that scum will insensibly waste itself, and disappear at last. Keep up the fire till taking a little of that oil, with a stick, you see it draw to a thread, like as varnish does. Then, take it off from the fire. But if, trying it thus, it prove too thin, add some more rosin to it, and continue to boil it.

2. When it is come as it ought to be, varnish whatever you want with it, and set it in the sun to dry, or before the fire, for it cannot dry without the assistance of either of these.

N. B. This composition of varnish has this particular property, viz. that, if you lay it on wooden wares, hot water itself cannot hurt it, nor have the least power on it. You may, therefore, make a very extensive use of it. But you must take care to choose the finest and the most perfect rosin, and to boil it well, for a long time. *Quære, Would not such a varnish be extremely useful, to preserve what is much exposed to the injuries of the weather, in gardens and elsewhere; such as sashes, statues, frames, hot-houses, &c.?*

LII. *Callot's varnish, mentioned in Chap. I. p. 2.*

1. Take two ounces of the finest lintseed oil; benjamin, in drops, two drachms; virgin wax, the bulk of a filbert. Boil all this together, till it is reduced to one third; and, while it is a boiling, never cease to stir with a little stick. When done, bottle, or put it in a large mouthed vessel.

2. To use that varnish, warm a little the plate you intend to engrave upon; and, taking a little of the varnish with the tip of your finger, spread it delicately over the plate. Observe to put as little of it as you can, and to lay it on as smooth and equal as possible. When done, smoak the plate, on the varnished side, with a candle, passing and

and repassing it gently, over the flame of it, till it is black every where. Set it again, now, on the chafing-dish, wherein there are kindled charcoals; and, when the plate has done fuming, then the varnish is sufficiently hardened. You may then chalk, draw, and etch, whatever you will on it.

Such is the true receipt of the varnish, which the famous *Callot* made use of, to engrave his most admired and truly admirable subjects.

LIII. *A varnish to lay on paper..*

Begin by laying on your paper one first coat of very clear and thin size. This being dry, melt three parts of oil of spike and one of rosin together; and, when come to the consistence of a varnish, you lay one second and light coat of this over the first made with size. This varnish is very fine, when very smoothly and equally laid on.

LIV. *Another varnish.*

Take mastic and sandarak, equal parts, of each two ounces. Pound them into a fine powder. Have three ounces of lintseed-oil, and as much of spirit of wine, in which, being mixed, you put your powders. Set this, in a well stopped matras, in a *balneo mariæ*, to boil and concoct together for one hour; and this varnish is done.

LV. *L'Abbe Mulot's varnish.*

Take of spike oil, one ounce; pulverised sandarak, half an ounce. Put all in a bottle, and set it in the sun till perfectly dissolved. This composition is particularly fit to varnish gold or silver, in shell, which has been laid on with a hair pencil.

LVI. *A varnish to lay over plaster works, or figures.*

Take fine white Alicante soap, rasp it fine, and put it in a glazed pipkin. Dissolve that soap, in the pipkin, with your finger and a little water, added gradually, and little at a time, till it comes thick and milky. Cover this, for fear dust should come to it, and let it rest so for seven or eight days. Take, next, a soft and short hairy brush,

dip it in this soapy preparation, and wash the plaster figure all over with it, then set it a drying. When dry, rub it gently with a piece of cloth, placing yourself between it and the light, that you may perceive better the places which take the polish; when done thus every where, your statue will appear as white, shiny, and beautiful, as alabaster.

LVII. *A very fine red varnish.*

1. Take oil of spike, one pound; and litharge as much. Boil both together, for one quarter of an hour, in order to clarify the oil, or, what is called, ungreasing it. When thus clarified, take one pound of it, and six ounces of shell-lac, which melt together in a matras, or a varnished pipkin. Then, dilute it in some cinnabar, which had previously been grinded on a stone, with chamber-lye; and the varnish is done.

2. Of this composition, lay first three or four coats on your work, and allow time sufficient, between each coat, to dry. When the last is given, lay on another of pure and clear varnish, without cinnabar, made with one part of spirit of wine, and four of oil of spike, and some shell-lac.

LVIII. *A varnish to gild certain parts of stamped leathers, silvered in some places with pewter leaves, and otherwise adorned with running stalks of flowers, various colours, figures, and other sorts of embellishments.*

1. Take lintseed oil, three pounds; of that sort of varnish called *Arabian sandarak*, and rough pitch, equal quantities, one pound each; and saffron, half an ounce. Instead of saffron, you had better, if you have that opportunity, make use of the stamens of lilies, which are infinitely preferable. Put all into a varnished pipkin, and set it over the fire. Take great care not to have it burn; and, to avoid it, keep continually stirring the matter with a spatula. When you want to know whether it be or not sufficiently done, have a hen's feather, just dip it in, and off quickly. If the feather be grizzled, it is a proof the matter has sufficiently boiled. Therefore, take it off from

from the fire, and throw in one pound of well chosen and picked hepatica aloes, in powder. Mix well this with the spatula, and set it again on the fire, to concoct well this addition with the rest. If you see that your matter boils and swells, you must take it off, and let it rest awhile; during which time, take some of the coals away. Set it now again upon this more moderate fire, stirring always well, that all may be perfectly incorporated. As soon as this is done, take it off, let it cool a little, and strain it through a strong coarse cloth, and keep it for the following use.

2. Apply the silver, or pewter leaves, on the leather, with the white of an egg, or gum-water. When these are properly laid on, give one coat of the above varnish, quite warm, on such places as you want to appear gilt, and set it in the sun. When dry, it looks like gold.

N. B. The *Arabian sandarak*; we have prescribed above, is known by some, under the denomination of *Gum of Juniper*.

LIX. *To imitate porphyry.*

Take English brown red; if too red, add a little umber to it, or some foot. Pound all into powder. Then have a marble stone, of a fine polish, which overlay with oil. Make a colour composed of brown red, and a little flat, or Venetian, lake, previously grinded with gum adragant. Then, with a largish brush, take of that colour, and asperse your oiled marble with it, by striking the handle of the brush on your wrist (as bookbinders stain the covers of their books). When your marble shall have been thus well speckled all over with that red colour, you let it dry. Then, taking your lump of brown red and umber, dilute it, make a thin paste of it, and lay it on your speckled marble. When this is also dry, it admits of a very fine polish, and looks like porphyry.

LX. *To imitate serpentine.*

1. Take auripigment, grind well first with water, and next with a little addition of indigo. Let this dry; then reduce it to an impalpable powder; then mix it with a

little gum adragant, and make a paste of it, as in the above receipt.

2. After this is done, take some lighter green, put a little more auripigment with the indigo, till you come to obtain the true hue of the spots which are in the *serpentine*. Of this colour you take with a brush, and asperse with it a marble piece, in the same manner exactly as described in the preceding article; and when this is dry, lay your first prepared paste on it. For the rest, do as above.

N. B. You may thus, with a brush, imitate, or even invent, all sorts of marbles, according to your taste and fancy; and, when the first laid colours are dry, lay your paste over them, let them dry likewise, and polish. For example, have several different colours prepared as above; asperse, or mark with each of them separately, and one after another, on some piece of glass, or well polished marble. Then make a paste, and lay it over them, of whatever colour you will. If you will have it white, it is done with whitening, and a little mixture of yellow ochre. These sorts of works admit of being overlaid with an exsiccative varnish.

C H A P. IV.

SECRETS relative to MASTICHS, CEMENTS,
SEALING-WAX, &c. &c.I. *A subtile mastich to mend all sorts of broken vessels.*

TAKE whites of eggs, and beat them well to a froth. Add to this soft curd cheese, and quick-lime, and begin beating a-new all together. This may be used in mending whatever you will, even glasses, and will stand both fire and water.

II. *Another.*

Take rosin, yellow wax, sulphur, and cement. Sift this last very fine, and melt all together; then use it.

III. *A mastich to make rock works.*

Take six parts of Paris-plaister, and one of soot, well mixed together.

IV. *An excellent mastich.*

Take coarse turpentine, four ounces; fricasseed and pulverised bullock's blood, one ounce; black pitch, four; wax, two; rosin, one; pounded glafs, one; cement, one; and sulphur, half a one. Boil all together, after having well pounded and grinded each of them separately.

V. *A mastich for broken wares.*

Pound a stone jar into an impalpable powder, and add to it some whites of eggs and quick-lime.

VI. *Another*

VI. *Another mastich.*

Take quick-lime, cotton and oil, of each equal parts in weight.

VII. *Another.*

Take frankincense and mastich, of each half an ounce; bol armeniac and quick-lime, of each two ounces.

VIII. *A cement.*

Take rosin, one ounce; grinded tile, half an ounce; mastich, four ounces.

IX. *A glue to lay upon gold.*

Boil an eel's skin, and a little quick-lime together; when boiled gently for the space of half an hour, strain it, and add some whites of eggs beaten; bottle, and keep it for use.—The method to use it afterwards, is to warm it and lay a coat of it on marble, delph, Worcester, Stafford, or any other earthen wares, &c. and when nearly dry, write, paint, or draw what you please on it with a pencil, and gold in shell.

X. *A size.*

Take half a pound of fresh cod's tripes, boil it in two quarts of white wine, reduced to one third. To take off the bad smell, add, while it boils, a little cloves and cinnamon. Then throw this size in whatever mould you please, to make it in flakes.

XI. *An exceeding good size, called Orleans size.*

Take the whitest ifinglass you can find; soak it in finely filtered quick-lime water, during twenty-four hours. When that time is over, take it off bit by bit, and boil it in common water.

XII. *A cement for delph, and other earthen wares.*

Take what quantity you will of wax and rosin. Melt them together, and add while in fusion, a discretionary quantity of marble pounded into a very fine powder.

XIII. *Another*

XIII. Another for the same purpose, which resists water.

Take quick-lime, turpentine, and soft curd cheese. Mix these well together; and, with the point of a knife, put of this on the edges of the broken pieces of your ware, then join them together.

XIV. A cold cement for cisterns and fountains.

Take litharge and boil in powder, of each two pounds; yellow ochre and rosin, of each four ounces; mutton suet, five ounces; mastich and turpentine, of each two ounces; oil of nuts, a sufficient quantity to render malleable. Work these all together; and then it is fit for use.

XV. A lute to join broken vessels.

Dissolve gum arabic in chamber lye over a chafingdish; stir with a stick till perfectly dissolved, then add an equal weight of flour, as you had of gum arabic, and concoct the whole for one quarter of an hour, or more, if requisite.

XVI. A strong glue with soft cheese.

1. Take a cheese from Auvergne. Let it be the fattest and newest you can find, neither dry nor moist; wash it in very warm water, so long as it should remain clear; then set it to rot in clean water, till it begins to stink. As soon as you find it is so, boil it in water, with quick-lime; and when dissolved into a glue, take it off from the fire, it is done.

2. If you dry some whites of eggs in the sun, and that, pounding them into powder, you should add some of that powder with the cheese when you dissolve it along with the lime, the glue will be so much the stronger.

N. B. Observe that no other cheese, besides that which comes from Auvergne, has the quality requisite for this composition.

XVII. To make a strong mastich.

Take one pound of rosin, a quarter of a pound of shoemakers rosin, two ounces of new wax, two of black pitch, and one of tallow. Boil all gently together on a slow fire;

fire; and when well incorporated together, add some brickdust, finely sifted according to discretion.

N. B. The quantity of tallow is to be proportioned to the degree of dryness you require in this composition; so that you may, on that principle, discretionally increase or diminish the prescribed dose of that ingredient.

XVIII. *To make corks for bottles.*

Take wax, hog's lard, and turpentine, equal quantities, or thereabouts. Melt all together, and stop your bottles with it.

XIX. *To imitate rock works.*

Take white wax and rosin, equal parts; and brimstone, a quarter part of both the other two put together. Melt the whole at the same time, and throw it in cold water. It will form itself like the scum of the sea. When you want to apply it, warm only that part by which you design to stick it.

XX. *To rub floors with, whether boards, bricks, &c.*

Take a pailful of scarlet wash from the dyers, with this stuff rub your floor by means of an old hair broom. Let it dry, and observe not to tread upon it till it is perfectly dry, then have from the plumber some black lead, which is generally of a black or reddish hue, squeeze well all the knobs you may meet with between your fingers, and rub your floor all over with it, with your hands, then with a rough dry brush, scrub well your floor, till it comes fine and shiny.

XXI. *A composition to make a relief fit to gild over, or even to raise an embroidery.*

1. Take one pound of lintseed oil; sandarak, mastich, Burgundy pitch, assafœtida, new wax, and turpentine, equal quantities, four ounces of each.

2. Pound all, and put it in a varnished new pipkin, to boil for two hours, over a slow fire. Then keep it in the same pot, to make your paste as you want it.

3. This

3. This paste is made as follows. Take ceruse and umber reduced into a subtile powder, which dilute with the above composition, in sufficient quantity, to make a sort of dough, observing never to make more of it at a time than you think to employ directly, for when dry it becomes as hard as marble.

4. The method of using it is to draw on whatever you will, whether cloth, linen, silk, thread, plaster, &c. the outlines of what you want to have raised in relief, as arms, trophies, figures, fruits, flowers, &c. according to your design, or fancy. Then fill up those sketches, and raise them with the above paste, while it is soft; and when it begins to dry, you gild, silver, or paint it over as you like.

5. You may paint also the ground of those reliefs with whatever colours you please, and enrich it with gold spangles, if you chuse. The way to do it, is by laying first a coat of varnish of isinglass and rosin melted together.

N. B. There is a work of this kind to be seen at Vienna, on the great altar of the Virgin Mary.

XXII. *Sealing wax. Recipe 1st.*

Take one pound of shell-lac; benjamin and black rosin, half an ounce each; vermillion, eight drachms. The whole being melted, make your sticks on a marble table, rubbed over with oil of sweet almonds; and take care to have done before the wax is cold.

XXIII. *Another sealing wax. Recipe 2d.*

Take turpentine and sailor's pitch, six drachms of each; either shell-lac or dragon's blood, one; sulphur citrinum, two. Mix and incorporate all together over the fire, and form your sticks.

XXIV. *Another. Recipe 3d.*

Take gum *hæderacea*, shell-lac, sandarak of the ancients, otherwise printer's rosin, and mastich, two ounces of each; rosin, four ounces; turpentine, half an ounce. Mix all in a very warm bell-metal mortar, and make your sticks.

XXV. *Another.*

XXV. *Another.* Recipe 4th.

Take shell-lac and mastich, of each one ounce ; dragon's blood, three ; cinnabar, half an ounce ; turpentine, one. Mix all, and make your sticks.

XXVI. *Another.* Recipe 5th.

Take Greek pitch, one pound ; white mastich, five ; frankincense, five ounces ; cinnabar as much as you see it requisite to give the red colour.—Put the pitch first on the fire to melt ; next put the mastich, and the powder of frankincense ; and last of all, the cinnabar grinded with a little oil. Incorporate all well, and take it off from the fire, to make your sticks.

XXVII. *Another.* Recipe 6th.

Take shell-lac, twelve ounces ; mastich and rosin, of each, one ounce ; dragon's blood, three ; minium, half an ounce. Dissolve the shell-lac in vinegar ; add if you will, some turpentine oil and sulphur, to the quantity of four ounces of each, and two of ammoniac salt. The whole being melted, make as fast as you can your sticks of the form and size you like.

XXVIII. *Another.* Recipe 7th. *Excessively good.*

1. Take shell-lac, &c. &c. pound them all into a very fine and impalpable powder. Then have two wooden pallets present upon them, before the fire some powder of one sort to melt, then move it and stir it with the said pallets. Take again of another powder in the same manner, and mix it in the same way before the fire with the first. Then another, and another, till they are all, by this method, perfectly well amalgamated together.

2. Have now some cinnabar in powder, which put in a pan with water. In that water and cinnabar powder, set to infuse, or only touch your incorporated gums, to make the composition take colour. When thus sufficiently coloured, take it out of the water with both your hands and the wooden pallets, and have a person to help

help you. This, having wetted his hand, will draw some of the said gum, and handling it on a table, will form the sticks.—For two pounds of gums, two ounces of cinnabar are wanted.

XXIX. *Another. Recipe 8th.*

Take gum-lac, four ounces; cinnabar, half an ounce; rosin, four and a half. Melt the rosin with a little vinegar, and skim it. Then take it out of the fire; then mix it with the lac and vermillion both well pulverised; and, when the composition begins to cool, form your sticks with it.

XXX. *An excellent sealing wax, by Girardot. Recipe 9th.*

Put four ounces of rosin, and four and a half of whitening, and melt them together, in a non-varnished pipkin, over kindled coals. While this is in fusion, have another pot, similar to this, in which you keep two ounces of shell-lac, in dissolution with vinegar. Now steep a wooden stick in the first pot, and another in the other pot; then, over a chafingdish, turn quickly, one over another, the ends of your two sticks together, to mix and incorporate well what matter they shall have brought along with them from each pipkin. And after having turned them thus a reasonable time, you see both matters are well embodied, steep them, at different times, in the following liquor, to colour them.

XXXI. *A colour for the above wax.*

Grind, upon a porphyry table, two ounces of cinnabar, with a sufficient quantity of nut-oil, to make it a liquid. In this you dip your sticks, at several times; and take care, in doing it, the composition should not grow cold. Wherefore you must, each time you steep them in the colour, carry them again over the chafingdish, to keep them in a due state of malleability. And when you find the matter sufficiently tinged with red, form your sticks as usual, on a marble, or other well polished table.

C H A P. V.

SECRETS of GLASS MANUFACTORY, and the
making Compositions to imitate PRECIOUS
STONES, commonly called FRENCH PASTE.I. *The general composition of the paste to make spurious precious stones, such as emeralds, sapphires, rubies, &c.*

1. **P**UT three ounces of Poitiers burnt lead in a sufficient quantity of water to have this rise about three fingers above the other. Beat next both together in a bottle, and let it settle. Draw, by inclination, this water, as soon as the lead is separated from it, in some other vessel. It will serve you to wet the inside of the glazed earthen pot in which you are to put your ingredients, and prevent their sticking to it.

2. Dry, now, three ounces of minium, and mix it with the aforesaid burnt lead, one ounce of calcined crystal, and one scruple of copper filings. All these being previously well pulverised, and mixed, put them in a glazed pipkin, which have hardened, and wetted afterwards infidely with the abovementioned lead-water. Cover it; then put it in the furnace of a glass-maker, three or four days, or in a wind furnace, for one day only. At the end of that time you shall find you have got a very fine white paste, which you may cut as you like.

3. To make this paste yellow, you are to substitute iron filings, for the copper ones; and to make it to imitate rubies, substitute cinnabar.

II. *To make emeralds, and other precious stones.*

1. Dissolve some alkaline salt in common water, and filter

filter it through a hat; then recover your salt by means of evaporation. Dissolve it again, filter and evaporate as before, and repeat this operation three times. Then, pulverise this salt after the third evaporation, and put it by. Dissolve one ounce of verdigrease in vinegar, and strain it; then, put it by likewise. Have, next, fine crystal, which grind and sift very fine, in an apothecary's sieve, and after the same manner as they do the prepared crystal.

2. To that ounce of the said verdigrease, put two and a half of the crystal powder, and two only of the pulverised alkaline salt.

3. These three powders put in a small glazed pipkin, and lute it so that no air can get in to the contained ingredients. Let it dry for three days or more, then put it in a potter's kiln for twenty four hours. After that time you will find in the pot, a matter perfectly similar to the diamonds in beauty, and which you may cut, and work, in the same manner.—This composition is susceptible of all sorts of colours, and of being made, of course, to imitate all sorts of stones, in varying accordingly one of the drugs in the following manner.

4. For example. If you want to make a ruby, instead of the abovementioned verdigrease, which makes an emerald, put some cinnabar. For sapphires, put *lapis lazuli*; and for hyacinths, coral; all which are to be prepared, and used, like the verdigrease, for which they are substituted.

5. The finest paste for the making artificial stones is to be composed with crystals, pebbles, or Bohemian topazes. For, if you make your composition with glass and lead only, the stones will be deficient in weight and hardness.

6. The pebbles and the abovementioned topazes are calcined just the same way as crystal. You have only to mix afterwards with these powders what colour you please. Minium and verdigrease give the emerald colour. Ceruse and saffron of Mars, that of hyacinth. Minium and ceruse make a chrysolite. With the *zaphera*, or *lapis lazuli*, or again, with ammoniac salt and silver, you obtain a sapphire. They who know how to extract the

gold

gold sulphur from that precious metal, declare, that they can by means of this solitary and incombustible sulphur, give the crystal the most beautiful colour of rubies.

III. *To calcine calcedony-stone and crystal, in order to compose precious stones with them.*

1. Dissolve calcined tartar in about half a pint of water, then strain it into a basin. Now, in an iron spoon with a long handle, make red-hot your crystal, or calcedony-stone; and when red-hot, throw them in the said tartar-water. If you take them out, redden and extinguish them again six or seven times in the same manner, they will be perfectly well calcined. After having reduced them into an impalpable powder, you may use that powder, in due proportion, in whatever mixture you will, to give them a colour according to what you want to make. If for emeralds, for example, the composition prescribed in the above article will do very well.

2. Observe, however, that if you intend to make emeralds, the pulverisation of your calcined crystals must be made in a brass mortar; while if you intend to make rubies, you must use an iron mortar, and have a great care not to pound the crystals in a brass one.

IV. *To make emeralds.*

With two ounces of crystal duly prepared as before directed, join one of borax; eight grains of tin-glass calx, and twenty of magnesia. Mix all well together in a brass, or bell-metal mortar, and put it in a crucible; cover it with its lid, and lute it well. When the lute is perfectly dry, place the crucible two hours in a potter's fire; then take it out and let the composition cool. Break the crucible, and you will find an excessively fine composition to make emeralds.

N. B. Tin glass calx is nothing else but a dissolution of tin-glass in aquafortis, tempered afterwards with common filtered water.—Observe also, that you must not neglect stirring and mixing well the calx and magnesia together, before you incorporate it with the crystal.

V. *For topazes.*

Two ounces of crystal; one of borax; eight grains of tincture of Mars. Mix all well in an iron mortar, then proceed as before directed for emeralds.

VI. *For sapphires.*

Crystal, two ounces; borax, one; ultramarine, eight grains; and magnesia, twelve. Mix well, then proceed as above.

VII. *For amethysts.*

With two ounces of crystal, one of borax, and twelve of magnesia, you mix ten grains of ultramarine; then go on as above.

VIII. *For hyacinths.*

Take two ounces of crystal; one of borax; four or five grains of saffron of Mars, and as much of magnesia, then proceed as above.

IX. *For rubies.*

Dutch red jasper, six drachms; pulverised crystal, two; minium, twenty four grains. Reduce the whole into a subtle powder, and keep it seven hours at most in the potter's fire, as above directed.

X. *Another way to make emeralds.*

Take one pound of pebbles, calcined and prepared as before directed; salt of tartar, ten ounces; saffron of Mars, five times as much as you can hold on a Spanish real; and the fifth part of this whole quantity of brass finely pulverised.—When all is well mixed in a mortar, and put in a crucible duly luted, &c. put it in the fire for six days; and having taken it out, see whether the composition is fine or not. If too deep in colour, add a little pebble and salt of tartar properly prepared; if too clear, add some crocus or saffron of Mars, and brass, to raise it in colour.

XI. *Another*

XI. *Another composition for hyacinths.*

To your prepared crystal, add ten pounds of salt of tartar, about one spoonful of white wine tartar, and a little bran.

XII. *Another for rubies.*

Prepare one pound of pebbles, or crystal, and add to it a quarter of an ounce of dragon's blood, mix all well, and put in a crucible.

Observe, that if you set this composition longer than two days in fusion, it loses its colour. As soon, therefore, as you see it has acquired a fine degree, take off the crucible, and let it cool.

XIII. *To make diamonds.*

Mix, with a silver spoon, six parts of fine white calcined pebbles, reduced into an impalpable powder, with four of the whitest and best pulverised tartar, and seven of alkaline salt.

Put this in a crucible, made of the same earth as is used in glass manufactories, and put in their fire. The longer it remains there, the harder and finer the composition will be. It must be there seven months at least, before it can acquire a tolerable fine lustre.

Note. That the powders we have mentioned to make the above compositions with, are all to be sifted through a very fine sieve, before they are used.

XIV. *A water to harden artificial stones.*

Prepare and calcine, as before directed for crystal, some small bits of calaminary stone. Pulverise them, and then place that powder in a very damp cellar, till reduced into water. With this water knead some Roman, Dutch, or Hungarian vitriol, quite crude, without reddening it in the fire. When this paste, which is to be soft, is made, put it in a retort, and distil what water will come from it. With this other water, and some barley flour, make another paste quite hard. In this paste

paste put your lump of composition, or even the stones themselves, which are come from it, ready cut and polished, when they come out of the wheel, and make as a dumpling of the whole. Send it to the oven to be put in, and taken out, along with the bread. When your paste comes back from the oven, open it, and you will find your stones as hard as natural ones.

If they should not prove so hard as you wish them, repeat this operation once more, and they will then most certainly be as hard as true diamonds.

XV. *A dye, to put under diamonds, both true and false, when they are set.*

Gather the smoke of a candle in a cup, dilute it with mastich oil, make a thick mixture of it. Put some of this under your stone, whether fine or not, when you set it.

XVI. *To make white sapphires, to imitate true diamonds.*

1. Jewellers generally take a white sapphire, and put it on the fire in a crucible, in which they bury it under steel filings.

2. Some go still farther, and choose gold filings; fancifully thinking, that as this metal is far more precious than the other, it is likewise infinitely better for the operation, and of course to be preferred. But, deceived in their conjectures, as they must unavoidably be, who have no other guide to direct their judgment, experience has since shewn, that mangre the inferiority of steel to gold, yet the former metal's filings are, for the following purpose, greatly superior to those of the latter.

3. Bury your sapphire in a crucible, under steel filings. Set it on the fire, and let the filings become so hot as to be nearly melting, but you must take care they do not melt. Let your sapphire lay thus under these filings, a little while. Then take them off, and pick out your sapphire, to examine it. If its whitemess does not please

you yet, set in on the filings again, and renew this operation not only once, but as many times as you will find necessary to make it acquire that beautiful degree which you want your sapphire to have. Then set and colour them as was said before.

XVII. *A better way of doing the same.*

Mix together equal quantities of white enamel, finely pulverised, and steel filings. Have next a little of the same pulverised enamel, without mixture of filings, make a kind of paste with your spittle. Put your white sapphire in this paste, with which wrap it up well, and set it to dry in the oven. Tie this ball all round with, and at one of the ends of, a very fine wire. Then bury this ball in a crucible, under the first mixture of steel filings and enamel powder, and put it on the fire, which push to the degree of *nearly* fusing the enamel, taking care, however, it shall not positively happen. Then, with one end of the wire, pull out the sapphire from the crucible, and see whether its whiteness please you ; if not, begin again the same way as before, and repeat this operation, till you obtain the desired point.

XVIII. *A colour to make rubies.*

1. Melt in a crucible one ounce of mars regulus. Throw in it a similar quantity of copper, and as much of gold. Let the whole be in fusion till reduced to one ounce only. Add another ounce of mars regulus, and one of copper, and proceed as before. Repeat this operation seven times over.

2. Now take the lump which you find at the bottom of the crucible, and which ought to be as red as rubies, throw it in four ounces of granulated silver in fusion, and previously amalgamated with sixteen ounces of purified and animated mercury. Having thus put on this mixture, the gold prepared as we said, put all in digestion for fifteen days, over ember ashes only, for fear the mercury should sublimate. After that time is over, separate the mercury by distillation, and test the rest on the coppel.

3. This

3. This composition, projected on such crystals as are in fusion in the glass-maker's pot, will give you the most beautiful ruby paste which you can possibly imagine or wish for.

XIX. *To whiten amethysts.*

Let a glass bottle be almost filled with five or six ounces of purified nitre. In the nitre bury your amethysts. Then let this bottle itself be entirely buried also in a great iron pot, filled with sand, so that the air cannot possibly come at it, and give it a fire capable only to put the nitre in fusion, but not to make it red-hot, else all will be ruined. Let this remain in that fusible state five or six days. Then let the sand cool itself gradually. When quite cold, take the bottle out of the sand, break it, and you will find the amethysts of a fine white; and as they are cold, you may without any difficulty, throw them in water, to get the nitre away from about them. Should any of them prove not quite so white, you may save them for another time, to make them undergo the same operation along with some others. Suppose your glass bottle should unluckily come to break, and the nitre should run off, then you must absolutely take it out; for the amethysts, without nitre, would certainly be hurt by the fire.

XX. *To make emeralds light and hard.*

1. Calcine, six different times, rock-crystal, and plunge it, as many times, in cold water. Pound it on a stone of the same mineral, with the mullar of the like kind, and pass this powder through a fine silk sieve.

2. To two ounces of this powder join ten grains of scories of copper, well cleansed, and three times calcined. Pound and mix well these two ingredients in a brass mortar. Add four ounces of the best and finest borax, previously well pounded in powder by itself. Incorporate all together. Put this in a crucible, covered with its lid, and well luted. Place it, after the lute is perfectly dry, in a reverberating fire, for seven or eight hours, and let the fire be very clear. At the end of that time, stop the

ash-hole, and all the openings of the furnace. Let this composition perfectly cool, for fear it should bubble, or otherwise blow. Then break the crucible, and you will find a beautiful emerald paste, which may be given to the lapidary to cut.

XXI. *To give crystal a perfect hardness.*

Dissolve what quantity you like of urine salt in clear water. Filter and evaporate to dryness. Then make alternate *strata super strata* of this salt, and powder crystal in a very strong crucible, which set for eight days in a glass-maker's furnace. After that time, being cooled gradually, you may take it out, and get the composition cut, which will prove excessively hard.

XXII. *A cement to render crystal like diamonds, and give the sapphires of Alenson a hardness to cut glass with ease.*

Make a strong dough with sifted barley-flour and petroy (or rock-oil). Divide this paste in two equal parts. In one of them range your stones, so that they should not touch one another. With the other part of your paste cover this. Wrap up the whole with a good lute, and give it a wheel fire for four or five hours, gradually increasing the strength of the fire between every two hours. Then you will have a lump of stones, which will sparkle like true diamonds.

XXIII. *To make crystal throw off as much fire as diamonds.*

Take loadstone and new quick-lime, equal parts, two pounds of each; sulphur vivum, half a pound. Put all in powder, and stratify according to art, in a crucible, your crystal, ready cut, with this powder. Place this crucible in a glass-maker's furnace, for seventy-four hours, you will find your stones very fine, sparkling, and perfectly like the diamonds of the ancient rock.

XXIV. *Another way of making diamonds.*

Grind on marble, equal quantities in weight, of calcined silver, and French loadstone. Stratify in a crucible, your crystal stones, ready cut in imitation of diamonds, with

with this powder. Cover it with another crucible, and late it well. Then set it in a glass-maker's furnace, for one month.

XXV. To give the white amethyst the colour of a true diamond.

Wrap some amethysts in a paste of pure white enamel, prepared as directed in Art. xvi. Place them in a crucible; which cover with a tile, and put in a glass-maker's furnace, for forty-eight hours. Let it be red-hot all that time. Then take it off from the fire, and let cool. When these amethysts shall have been new polished, they will look like, and be judged for, true diamonds.

XXVI. To imitate calcedony.

Put, in a crucible, in a glass-maker's fire, some very fine crystal powder. When in fusion, add a little calcined silver to it; mix it well, and set it in fusion for twenty-four hours, then let cool. When you take off your matter, you will find it imitates perfectly well calcedony, part of it being bright, and the other a little more dull.

XXVII. To make a crysolite.

Project, on crystal, melted in a strong crucible, six times its quantity of iron scories. Keep this thus in an ardent furnace for the space of three days. Then let all cool. When you take that composition from the crucible, you will find it answer your expectation.

XXVIII. To make diamonds with jargons.

Put in a crucible equal quantities, well mixed, of iron filings, pounded and finely sifted, and powder of white wood coals. In this mixture, plunge and bury your jargons, and let none appear above. Give, first, a small fire to the crucible, and increase it gradually, till the jargons become red hot. Keep them in that state for a length of time; then let the fire go off gradually.

in the same manner in which you had increased it before. When cold, take out your *jargons*, which you will find have lost their first colour. To give them the true water peculiar to fine diamonds, take the powder of coals as before mentioned, and an equal quantity of minium. Put your *jargons* in the centre of that powder, in a crucible as before, observing to increase the heat and diminish it, just as in the preceding operation. When all is cold, you will find your *jargons* as fine and beautiful as true and natural diamonds.

XXIX. *To make Doublets in rubies and emeralds, as they do at Milan.*

1. Fix on the point of a knife a large piece of mastich. Heat it before the fire; there will immediately run a drop as white as pearl. This is called mastich in drops.

2. Now if you want to make an emerald, you must dye this drop of mastich with a little verdigrease diluted in oil, and a little addition of wax, if required. If it prove too thick, add a little water.

3. If it be for a ruby, take equal quantities of gum-arabic, *alumen saccarinum*, and crude roch-alum; boil all in common water; then add to it a little brazil wood, cut very thin and small, and let it boil again. You may add some *alumen catinum*, if you choose, which will darken your colour in proportion to the quantity you put in; then plunge the drop of mastich above mentioned in that liquor, and thus give it the red dye.

4. Have now two pieces of crystal ready cut by the wheel. Let them be both of the most perfect flat surface, and of the most exquisite fineness and precision in dimensions of their sides, when laid one over another, with this only exception, that the crystal intended to be the upper one, should be a little thinner than that which is intended to be laid under. Put each of these pieces on an iron plate over red-hot cinders, and set them thus till the crystal becomes very hot. Then with the above red-dyed drop of mastich which you hold at the end of a stick, and have a little softened before the fire, you rub gently the upper surface of the piece of crystal, intended to

to be the under one, till you see it has acquired a sufficient degree of redness, according to your liking. Then take with small pincers the other piece of crystal, quite hot, lay it on the former, and they will both stick to each other, without occasioning the least obscurity in the lustre of the rubies, which will be equally clear and transparent on both sides.

5. In the same manner proceed to make the emerald. Therefore, when either of these two operations is accomplished, your stone is ready to be set with a red tinsel under it, if a ruby; or a green one, if an emerald.

XXX. *To soften crystal.*

Redden it in the fire, and when full of fire, plunge it in mutton and lamb's blood, mixed and warmed together. Reiterate this two or three times, and it will be soft.

XXXI. *Another to soften crystal, or any other coloured stone, so that you may cut it like cheese; and restore it afterwards to its primary hardness.*

1. Take, in the month of August, goose's and goat's blood. Let each of them dry, till very hard. When you want to soften your stones, take an equal quantity of each blood, pulverise it and put in a pot, then pour over a strong lye made of pearl ashes. Leave it so for a while, stirring often; then add about a pint of strong vinegar. In this preparation, if you set your stones, and warm it a little over the fire, they will become so soft, that you may take and cut, or form them afterwards as you will.

2. To restore them again to their former hardness, put them in cold water, and let them there lay for about one hour and a quarter, it will be quite sufficient.

3. But to give them their lustre again, you must take antimony in powder, spread it on a very smooth leaden table, then polish your stones on this. It will restore them to their brightness as before.

XXXII. *Another equally useful to soften crystal and steel.*

Make a strong lye of quick lime and pearl ashes. Run it nine or ten times more over new lime and new pearl ashes, each time. Then put to soak, in this preparation, any piece of crystal or steel, for the space of twenty-four hours, and you will see what a surprising degree of softness they will have acquired by it.

XXXIII. *A paste, which will procure as beautiful emeralds as natural ones.*

Calcine, six different times, rock crystal, and plunge it, as many times, in pure cold water. Grind it into powder, on a rock crystal stone, with a mullar of the same. When you have rendered the powder very fine and impalpable, to one pound of it, add another of salt of tartar, drawn from red tartar, mixed well. Join to this, sixty grains of red copper, and fifteen of silver, both in shell, but grinded separately. Now mix the last powders with the former, on a marble stone, and put all together in a clean and double nealed crucible. Lute it well with its lid, and, when the lute is perfectly dry, put the crucible for six days on a clear, but gentle fire; then increase the fire till the crucible becomes red hot, place it immediately in the ardent and glass melting furnace, and keep it there in the same degree of heat for a month, without interruption. Then let the crucible cool gradually in the furnace, which is done by letting the fire go out of itself, having previously stopped all the holes and openings of the furnace. When you break it, you will find a beautiful green, which is fit to cut by the lapidary.

Note. Be careful of this composition, for it has all the merit and advantage of the true emerald. It vies with it in weight, colour, and hardness. In short, the greatest connoisseurs cannot distinguish these emeralds from the finest real ones.

XXXIV. *Another way of making emeralds.*

1. Take two large transparent river pebbles, or rock crystal

crystal pebbles. Calcine and sift six grains of copper, and two drachms six grains of salt of tartar, pulverised, and in the following manner.

2. Calcine the tartar to whiteness; throw it in water, and warm it to ebullition. But before it boils, it will throw a scum, which must be carefully skimmed off, as it is a prejudicial unctuosity. When all the scum is well off, evaporate the water, till what is on the fire becomes into a consistence like honey. Now add as much cold water as there was before. Heat it again to ebullition; and, before it boils, skim well again the new unctuosity which it will throw out, then boil to the consistence of honey. Repeat this operation eight or ten different times running, adding always new water each time, which you still skim, boil and evaporate each time, as prescribed for the first. At the tenth time, let the water you put in be first filtered once or twice through a paper, then vaporise the water entirely, and you will have a very fine and pure salt of tartar. By these means you purge the tartar of all its unctuosity, which would make the emerald scale and flaw on the lapidary's wheel while it is cutting.

3. Take this matter, pound and grind it with a brass pestle and mortar. Sift it in a very fine silk sieve. Pound a-new what shall not have passed through the sieve, and sift it again, and so on till you have reduced all into an impalpable powder. Put it in a crucible, as in the above articles, and place it in a melting glass furnace for twenty-four hours, and your matter will be done and ready for use.

XXXV. *To whiten imperfect diamonds.*

Make red hot, and calcine in the fire, a loadstone, and plunge it in the strongest vinegar, which you repeat eight or ten times. Then, with barley flour, pulverised verdigrase, and this vinegar, make a strong paste, in which you wrap up your diamonds. Dry first this paste by a gentle fire; then give it a smart one for four hours.

XXXVI. *To counterfeit diamonds.*

1. Melt by means of fire, some transparent pebbles.

E 5

Grind

Grind them next into a very fine powder, then set this powder again a-melting on the fire. Put your stones afterwards in a paste of barley flour, and bake under ashes, the diamonds will be done.

2. To give them a proper water, nothing else is to be done, but put them in *aqua vitae*, which having set fire to, let burn out entirely. By that operation they acquire the right colour of diamonds.

XXXVII. *Various dyes for precious stones.*

1. Dragon's blood in drops, pounded and sifted in alcohol, then dissolved in spirit of wine of six rectifications, will give you the colour for the rubies.

2. That of the topaz is made with gamboge, dissolved in the same spirit of wine as before, and put in a matras, to evaporate to consistence of honey; then it is fit for use.

3. For emeralds, fixed green verditure dissolved, and vaporised as above, will give this dye.

4. The same mode of proceeding, in respect to imitation of other stones, will give you the colour you may want for that purpose, if you take care to choose and draw, *secundem artem*, the dye from each of the colours fit for that object, and then apply it to your paste or composition in the following manner.

5. When the dye you intend to use is ready, have a crucible, bore a little hole at the bottom of it. Turn its bottom upward. Set your cut crystal on that hole. Make a gradual wheel-fire round it. While your crucible heats, make some small common pebbles red hot in the fire, and throw them in your liquor to give it a certain degree of heat, and prevent the calcination of your crystal. And, when this is sufficiently hot, plunge it in your dye.

XXXVIII. *A colour for glasses and enamels.*

Take Roman vitriol calcined to whiteness in the sun, three times wetted with brandy, and three times dried. Now calcine it in the fire to redness, and push the fire

for

for three days to the highest degree. Then, at the bottom of the retort you will find a sulphur of a dry rose colour, very dark, and deprived of all saline particles. You may use it after the method prescribed in the preceding article, for giving any glass, or enamel, a fine colour of rubies.

XXXIX. *Another ruby colour.*

Melt in a crucible one ounce of crystal, and throw on it the same quantity in weight of oil of mars, otherwise, oil of antimony, with two grains of virgin gold. Whatever remains fixed in the crucible is the enamel.

XL. *Another, the invention of Sainte Marie, the enameller.*

File and put in a matras a gold ducat, with two ounces of aquafortis, and one of ammoniac salt, to dissolve the gold. To facilitate the dissolution, place the matras on ember ashes. Then take two pounds of silver sand, one of salt, one of arsenic, and six of saltpetre. Pulverise each separately, and being afterwards mixed and put in a crucible, pour over it the dissolution of gold, which is in the matras. This crucible being put in a melting glass furnace for twelve hours, will give the finest red for rubies which can be found out.

Note. Sainte Marie sold it at three half crowns a pound; though for one crown he could make two pounds.

XLI. *A composition, the fundamental basis of all enamels.*

1. Grind on marble, and sift through a very fine sieve, equal quantities of lead and pewter-calx. Put it in a varnished pipkin filled over with water. Boil it some while; then pour it by inclination, in another vessel. Put new water, to boil again over the calx, and decant it as before, on the first water: which process you repeat till you have entirely dissolved all the calx. If some part of the metal remain at the bottom, too gross to be entirely carried by the waters, it must be put in a melting-glass furnace to calcine, having care to take out, in proportion

as it turns into calx, the upper part of the matter. When it is all calcined, continue dissolving it, by means of boiling water, as you did the first. When you have got all your waters of dissolution, vaporise them over a slow fire; and particularly towards the end of the evaporation, have a singular care that the fire be not too fierce, which then remains at the bottom, very fine and subtilized.

2. To twenty-five pounds of this calx add an equal weight of frit, made of tarce, or white sand, well pounded and sifted through a very fine sieve, and four ounces of white salt of tartar, pounded and sifted in the same manner. Put these ingredients in a melting glass furnace; melt and purge them there for ten hours. Then, having taken the pot off from the fire, take out the matter, which, after having well pulverised, keep in a close dry place, where dust cannot come at it.—Such is the first and principal matter to be used in the composition of enamels, of whatever sort of colour you want to make them.

XLII. To make an enamel as white as milk.

1. To six pound weight of the matter just described, put forty-eight grains of magnesia, prepared as follows.

2. Put in an iron spoon, to the reverberating fire, the bits of magnesia, rough as it comes from the mine. When it is whitened, pour good vinegar over it, then break it small, and wash it several times with warm water. Dry, pulverise, and sift it, then preserve it in a covered pot for use.

3. This magnesia, and primary enamel matter, you put, in the above-prescribed proportion, in a crucible, on a glass-melting fire, then throw the whole contents into clear water: dry it, melt it again, as before, and throw it in water again, and so on. This operation repeat three times. Being thus well purified, if you find it not quite white enough, add a little more magnesia, and begin the same process as before. Then take it off the fire, and make it into small round cakes.—Such is the method of preparing the enamel to paint with on gold, and other metals.

XLIII. To

XLIII. To make an enamel, turquoise colour.

Put six pounds of the said enamel primary matter in a varnished crown-glass pot. Melt and purge it three times as usual, and prescribed in the preceding article. On the third time project, at four separate times, three ounces of scories of copper, prepared as directed in Art. xliv. mixed with ninety-six grains of zaffar prepared the same way exactly, and in the same manner as the magnesia, and forty-eight of that very magnesia in subtile powder. Stir well the matter on the fire, at the time of each projection, with a long-handled iron hook; and, when the colour seems to be to your liking, take it out of the fire, and make it into small round cakes as usual. This will make a most beautiful turquoise enamel.

XLIV. How to prepare the scories of copper for the above purpose.

This preparation is very simple. Wash, first, the scories well, and set them to calcine three days at the entrance of a reverberating furnace. Then grind this and sift it. Calcine again as before, grind and sift the same, repeating this operation three different times. When finished, it is called a calx of copper. Of this mix three ounces with forty-eight grains of prepared magnesia, and ninety-six of zaffar also prepared, for a projection on enamel's primary matter, to make a fine sort of turquoise colour.

XLV. To make blue enamel.

Put in a varnished crown-glass pot, in a melting-glass furnace, four pounds of common primary enamel matter; two ounces of zaffar; and forty-eight grains of prepared scories of copper, all previously well pulverised and mixed. When this composition is in good fusion, throw it in water, then dry it, and put it again in the same pot. Leave it there till the matter is well incorporated, and proceed as directed for the others.

XLVI. *To make green enamel.*

1. Melt and purge, by the glass melting fire, and in a varnished crown-glass pot, four pounds of the primary enamel matter. Leave it there twelve hours; after which throw it in water, dry it, and put it again in the same fire, for the same time, to cleanse it well.

2. Grind into a very subtile powder, some of the aforesaid scories of copper, and some scories of iron. Mix these powders together, *viz.* two ounces of the former, and forty-eight grains only of the latter; which, being divided into three different parcels, project, at three distinct times, on the enamel matter in fusion, stirring well with an iron hook at the time of each projection, that the colour may better incorporate; and in twelve hours afterwards you will find a very fine green enamel.

XLVII. *To make a black shining enamel.*

Take of our primary enamel matter in powder, four pounds; red tartar, four ounces; and of our prepared magnesia, in subtile powder, two. Put all this into a varnished pipkin, so large that all these powders together shall not come higher than the third part of the vessel, this matter, when melted, swells very much. When in perfect fusion, throw it into water; take it out to dry, then put it again in the pot, and purify it as before. Do so till you find it sufficiently purified; then take the pot off the fire, and the matter out of the pot.

XLVIII. *To make an enamel, purple colour.*

Reduce into subtile powder, and mix well together, six pounds of our primary and general enamel matter; three ounces of prepared magnesia, and six of scories of copper, prepared as before mentioned. Melt and purify all this in a varnished pipkin, by placing it in a melting-glass furnace. When in good fusion, throw this matter in water; dry it, and put it again in the same pot to purify it anew by the same process. If you find your colour to your liking, take the pot off from the fire, and keep your enamel for use.

XLIX. *Another.*

XLIX. *Another.*

Take six ounces of our general matter, two of prepared magnesia, and forty eight grains of the aforesaid preparation of scories of copper. Pulverise, and proceed as above. This composition will give a very fine purple enamel, fit for all sorts of works which goldsmiths will employ it in.

L. *A yellow enamel.*

Take, and reduce into a very fine powder, six pounds of the general matter; three ounces of tartar, and seventy-two grains of prepared magnesia. Put all into a pot large enough not to lose any thing of the matter when it comes to swell at the time of its fusion.

LI. *To make a crystalline matter, which serves as a basis to red-colour enamels.*

1. Take twenty-four pounds of salt, drawn from trituration, lotion, filtration, and evaporation; and fifteen pounds of white tartar, that is to say, of white and transparent river pebbles, calcined and reduced into an impalpable powder. Both these ingredients being equally reduced into a subtile powder, mix and wet them so as to make a hard paste of them, of which you will form small thin cakes. Put these cakes in pipkins, and place them in a lime, or potter's-kiln, where they are to calcine for ten hours.

2. When these cakes are well calcined, reduce them into a subtile powder, and add four pounds of lead and pewter calx (prepared and subtilized as before directed, Art. xli.) and as much white tartar also calcined and purified by lotion, &c. (as directed, Art. xxxiv. n. 2.) These three last ingredients being reduced into a subtile powder, put them in a varnished pipkin, and place them in a melting-glass furnace, there to be melted and purified, by throwing the composition, when in fusion, into water, then drying, &c. three times; after which the whole is completed.

LII. *How*

LII. How to make a fine preparation of fusible magnesia, to be employed in the making of red enamels.

1. Take whatever quantity of magnesia you please. Add to it an equal quantity of nitre prepared by lotion, filtration, and evaporation. Set this matter in a pipkin to calcine for twenty-four hours, by a reverberating fire. Then take it out, and wash it with warm water, to cleanse it from all the nitre, and dry it. When this magnesia be dry, it will be of a very fine red.

2. Now add to it its equal weight of ammoniac salt. Grind all well on a marble stone, wetting it with distilled vinegar, so that it comes into a sort of clear paste, or colour for painting.

3. Then dry this matter; and, having pulverised it, put it a subliming in a strong glass matrass, with a long neck and a large belly. Give it the sublimating fire for twelve hours; break the matrass; weigh first the sublimed part, and mix it with what remained at the bottom; add as much new ammoniac salt as you had weight of sublimation. Grind these well together, wetting them with vinegar, then dry and sublime again as before. Renew this operation so many times as will be requisite, that the magnesia remain at last in a state of fusibility at the bottom of the matrass.

4. This liquid is fit for staining crystal of a very fine ruby hue; and, when employed with enamels, will render them of a most beautiful red.

LIII. To make red enamel, of a beautiful ruby hue.

Put twenty ounces of the above fusible magnesia, to one pound of the crystalline matter (Art. li.) in good fusion. Purify the whole well, and try the colour.

Note. According to the proportion of fusible magnesia you put in this composition, you raise or lower the hue of your enamel. And, if carried to the degree of rubies, it will prove bright and beautiful.

LIV. To make an enamel, true Balais-ruby colour.

Take ten pounds of our crystalline matter. Purge it in the melting glass furnace, by fusing it, then throwing it in

in water, drying, pulverising, and melting again, &c. three times. Put it again for the fourth time in fusion; and, when in that state, give it the purple colour by means of a proper quantity of fusible magnesia, as mentioned in the preceding article. After this, project on it, at eight different distances of time, as much calcined alum, in subtle powder, as you will find requisite to give it that degree of red hue you desire; which to imitate the *Balais* ruby colour, must be fuller and deeper than that of the clear rubies.

LV. To make a bright enamel, escarboucle colour.

1. Take very fine gold, one part. Purify it again, and open it in the following manner. Dissolve it in good regal water; distil it first from the gold, and recohobate it six different times. After this, take your gold powder from the vessel, put it in a crucible, covered and luted as usual, and place it in a furnace to the reverberating fire, where it shall be left to calcine till it becomes a very high and deep red, which cannot happen till after several days calcination.

2. Then, by projecting this part of well opened gold on twenty of the beforementioned crystalline matter, previously purged according to direction, and put in a state of good fusion, an enamel will be obtained, of the most beautiful, transparent, *escarboucle* colour.

LVI. To give rock crystal the various colours of topaz, rubies, opal, heliotrope, and others.

It is no less true than surprising, that all these different colours are the product of the same materials, and are operated in the same vessel, and at the same time. But as the action of these metallic minerals, which tinge crystal in that operation, is stronger in proportion to the quantity of similar spirits they meet with in ascending to the top of the crucible, so the colours acquire also more strength and vivacity.

1. To make this operation, take two ounces of orpine, of a gold or saffron-like colour; and as much crystalline arsenic; one of crude antimony, and as much of ammoniac

ammoniac salt. Pulverise and mix well. Make a bed of this powder, in a large crucible; over it lay another of rock crystal in bits, chusing the smallest for the first, or bottom bed; and the largest and purest for the higher and last beds. Make thus, *strata super strata*, of your powder and crystals, till you have employed all you have got of them, and take care to end with a bed of powder. The crucible being thus filled, cover it with another, at the bottom of which, now become the upper part, a hole, of about two inches in diameter, being made, in order to give room for the exhalation of the fumes. Lute the joints, and when dry, place the crucible in a furnace, over black charcoals, and range more of them all round it, to the half way of the upper one. Add then some kindled coals, in order to light the others gradually. These coals ought to be large and long, and all of oak wood. Care must be taken to light them very regularly, letting them go out naturally of themselves, and guard yourself carefully from the fumes. As soon as the fire begins to abate, stop the hole of the upper crucible, to prevent the admittance of the cold air, which will break your crystals.

When the crucibles are cold, unlute them, take your crystals, and get the finest and best coloured polished by the wheel. You will find these stones to be very little, if at all, inferior in point of beauty and hardness, to the eastern ones.—This *Secret* has gone through many experiments.

After having given the method of making all sorts of colours, which counterfeit the natural precious stones, the manner of stamping these artificial ones; a *Secret* by which the finest and most precious original cameos and intaglios may be copied in a manner not in the least inferior to the original, and which makes, at this present time, the amusing occupation of most of the ladies and gentlemen at court.

LVII. *The method of counter-drawing on artificial stones, the original cameos, intaglios, and other gems, which are kept and preserved in the several museums of Europe.*

Chuse the finest sort of tripoly which can possibly be found.

found. Grind it on marble, into an impalpable powder, and as subtile as possible. Add a little water to it, so as to make a sort of paste with it, of the consistence of colours on pallets for painting. When it is in that state, put it in a little square tin mould, with turned up edges. Press well your paste down in it, and smoothen the surface. As soon as you see it begins to dry, stamp on it the seal of which you want to obtain the impression, and taking it off skilfully from the tripoly paste, let this dry thoroughly. When you find it is perfectly hard, and the strokes of the seal are solid, put on the impression some powder of crystal, or any artificial stone you please, whether red, green, or blue, or any other colour. Then, with a metal pipe, blow on that powder the flame of a candle, or a lamp, till the crystal is perfectly melted. When done, lay something, such as a small iron pallet, of nearly the size of the seal, on the melted paste, and press it gently to make it take the better the impression, and all the turns of the design, and then let it cool. When you take the crystal up, you will find it to be a perfect copy of the original. You may then send it to the lapidary to be cut, and set for seal or ring, as you like. From these very copies you may even get other copies, by following the same process of operation; but it must not be denied, these will not be quite so perfect as those obtained from the originals themselves.

Note. When you have made on the tripoly paste the impression of the original seal, the safest and shortest way would be to bake it in a furnace, under a tin arch, to prevent the coals from touching the impression, which might hurt and damage the relief. Then take off your mould, and put on the stamp, crystal powder, or other fusible matter, you may place it again under the same arch, in the furnace, and when that powder is melted, do as before directed.

LVIII. *To jasper glass globes.*

Wet the inside of a glass globe with common water; then throw in some powder, blue, or ultramarine, or else some of the finest smalt, and stir well the globe, that these powders may stick every where. Then dilute some other colours

colours with nut oil, keeping each particular colour by itself. With the downy end of a quill, put some of these colours, one after another, in the globe, touching it every way with them. Put some flour after that in the globe, and shake it so as to make it go all over, and then the work is finished.

LIX. To give globes a silver colour.

To four ounces of pewter, in fusion, add two of quicksilver. Stir all well with a wooden spatula; and when the whole is well incorporated, pour some of this compound into your globes, which must previously have been warmed before the fire. Turn them in all manner of directions, that the composition may fix itself better and more equally in all their capacity.—Chop some tinsel very fine, and throw it in the globes when the pewter begins to cool, these little lamians will stick themselves to it, and produce the finest effect imaginable.

LX. A good method for tinning glass globes.

Melt together one ounce of tin glass, and half that quantity of pewter and of lead. When both are thus in fusion, throw in some mercury, and the whole into a pan full of water. Pour the water off by inclination, and dry this matter; then pass it through a piece of linen, and roll it in a globe that is very dry in the inside.

LXI. To make the same in colours.

To make these globes of what colour you like, mix some mercury with a great quantity of dry common salt, pass it through a piece of linen, beat it in a little chamber lye and water, which will granulate the mercury. If you put this mercury in your globes, just after you have coloured them, (as directed in Art. Ivii.) that mercury will fix itself into them, in little grains or globulas all round, and appear like diamonds incessantly sparkling.

LXII. To stick these globes upon one another.

Pound into powder half an ounce of dragon's blood, as

as much of bole armeniac, and a little quick lime ; which dilute all together with whites of eggs. Then cut a swine's bladder into small bits, of the form and size of a shilling ; put some of that glue on both sides of them, and put one thus glued between every two globes, supporting them with your hands till you see the glue has got hold of the glas. In about one hour's time, they will stick so very hard, that there will be no danger of their parting from each other. These are to be suspended in the air, or laid as ornaments on wainscotting, cornices, &c.

LXIII. *To make transparent frames.*

Boil for a quarter of an hour only, nut oil, six ounces ; white wax, four ; rosin, as much ; and Venice turpentine, two. When lukewarm, lay it on with a soft brush.

LXIV. *Another.*

Soak, for twenty-four hours, a fine white parchment skin, in whites of eggs and honey well beaten together. Wash then your parchment, paste it on the frame, and when dry, lay a coat of varnish on it.

LXV. *Another way, which will make the frame look as made of glass.*

Take one of the finest and most perfect sheets of vellum you can find. Wash it, paste it on the frame, and let it dry. Then boil in a glass vessel, over a sand bath, equal quantities of nut or lintseed oil, and water, with a little crown glass, pounded into a very fine powder. With this you may at any time give a coat to your vellum, and see the pleasing effect it will have.

LXVI. *A white paint to preserve the putty round the panes of glass.*

1. Grind white lead with water. Dry it, and grind it again with oil, then lay a coat of it over your putty. But if you want it to be still more durable, put two coats of it, after having added a part of fetid oil, made in the following manner.

2. Have

2. Have a leaden plate with turned-up edges to make a border. Fill it with nut or lintseed oil. Cover it with a piece of glass, and expose it in the sun. It will soon be fœtid.

LXVII. *To clear glass.*

Rub the glass crystal with a piece of lead; that will make it clear and bright.

LXVIII. *How to distinguish a true from a false stone.*

Warm an iron plate; rub some oil over it; spread glass dust on the middle, and cover that glass with kindled coals. Hold the stone you want to try over these coals, without letting it touch them. If the stone does not lose its lustre, and look dull, it is a true stone.

LXIX. *Another to the same purpose.*

Heat the stone by rubbing it with a piece of cloth. When hot, rub it with a piece of lead. If there remain any mark of it on the stone, it is a false stone.

LXX. *To make pearls, and swell them to what size you please.*

1. Take any quantity of seed of pearls. Let them be very white and not perforated. Wash them well in warm water, and let dry. Pound them in a new marble mortar, very clean and polished. Grind them next on a marble stone, into a very fine impalpable and subtile powder. Put this powder in a glass mortar, and dilute it in a good quantity of mercurial water. Pour this water into another glass vessel. Add more mercurial water to that which remained in the mortar, mix well and pour this water off again. Continue so doing till there shall not remain any of the pearl powder at all, and that both the pearls and the water shall have reciprocally impregnated the substance one of another.

2. Being so far conducted, lay the lid on the glass vessel in which the liquor is contained, and set it in the sun for the space of twenty days. At the end of which term, you

you may take notice of another liquor, like a greasy oil, swimming on the top of the former. Skim it carefully with a silver or glass spoon, and keep it separately in a phial, to use it in proper time, as shall be directed.

3. This being done, take the vessel in which the former liquor you have skimmed is, and place it in *balneo mariae* over a gentle fire. When the water of the *balneum mariae* boils, you will perceive another scum rising to the top of your liquor. Skim it again, and put it carefully in another distinct phial, to be used also when it is proper.

4. What remains at the bottom of the vessel, after this second scum is off, is called *Milk of pearls*; a drug much used among ladies who paint.—So far your materials are all prepared; the question is now to employ them properly; and that you shall find in the following article.

5. Take what kind of pearls you please, or rather happen to meet with; for, how brown, black or imperfect and ugly in every respect they may be, does not signify in the least, provided only they be round if you want them round, or oval if you want them oval. Thread them with a fine silver wire, or swine's hair; then put them to soak for the space of twelve hours, in the *Milk of pearls*. They will suck that liquor, swell, and soften themselves. At the end of twelve hours, take them out from that *milk* by their wire, and suspend them in so large a glass vessel as to have none of them touch any part of it. Cover the vessel with its lid, and set it in the sun for twelve other hours; during which time, they will harden. When they have been there twelve hours, put them again to soak for twelve hours, in the same *milk* as before, to swell again; then, suspend them again in the sun for the same time, and repeat this operation, till the pearls have acquired the size you want them to have. For they will always feed and swell themselves, with that cream, whenever you put them into it.—When they have soaked in it for the last time, and been dried afterwards for twelve hours in the sun, then put them to soak for another twelve hours in the second stuff which you skimmed from the *milk of pearls*, while it was in the *balneo mariae*. Then set them again in the sun for twelve hours.—This term being over, put them to soak in the first sort of greasy oil, which

you

you skimmed for the first time from the liquor, after the twenty hours of its having been exposed in the sun. And when they shall have remained there for twelve hours, and been again exposed after that, for twelve more out of it, in the sun, as usual, you have then got very fine, and exceedingly good pearls; not sophistic, but true and natural; and you may have your own price for them.

6. Of the mercurial water, which is the chief thing, indeed, in this operation, we may safely aver, that it is a secret known by very few, and to those only who are well versed in the great Art of Chymistry. The manipulation described will undoubtedly afford no little pleasure and satisfaction to those who are acquainted with the process of making mercurial water, and who do not know, perhaps, the precious quality it is invested with, of composing or swelling pearls.

LXXI. To dye crystal ruby hue, with lake.

1. Take crimson, or the reddest sort of lake you can find, half a drachm. Put it in a square glass phial, and boil it in a *balneo marie* for two hours. The lake, thus situated in the glass for two hours, not being touched by the water at all, but only penetrated by the heat it receives from it, shrinks at last and becomes fryable. Take it out of the phial, grind it on marble into a subtile powder, then add three or four drops of Venice turpentine. Put it again in the same phial as before, and boil it one hour in the same manner, and your colour is done.

2. To make use of it, you must hold, with small pincers, your crystal over a chafingdish, filled with live coals. Then with the point of a wooden skewer, take the colour, and lay it on the crystal, which being hot, takes it in immediately. Let it cool, and set it, and it will look of a very fine red hue.

LXXII. To make a sapphire.

1. Make some zaffar red hot in a small crucible. Keep it in that situation sometime, then throw it in the strongest vinegar you can find, or in lieu of it, in house

house chamber lye. Let it there lay in the coldest part of your house for one night. Then wipe it well, make it into a very fine powder, by pounding it in a marble mortar, and keep it in a phial closely stopped.

2. To ten or twelve pounds weight of crystal, or transparent pebbles calcined, and mixed with salt of tartar, in the proportion of three parts of the first to two of the last, put as much as will lay on a shilling of the above prepared zaffar. Mix all with a silver spoon, then fill with it a pipkin, which put to the melting glafs fire. Half an hour after it has been in, fill it up again with the same powder, and another half hour after the same, till it keeps full. Then cover the pipkin well, and set it in the furnace the space of four months, at least; for the longer it is kept there, the finer and harder the composition will be.—Four or five days, however, after it shall have been in the furnace, it will not be improper to take out in a spoon some of the matter, and see whether the colour be to your liking; and if you find it too pale, add a little more zaffar to it; if too dark, some crystal.

LXXII. *Another composition for the sapphire.*

Take one ounce of calcined crystal; two drachms of minium; of lead and salt of tartar, about the weight of half a crown each; and three grains of zaffar. Put all into a subtile powder, and melt it in a crucible. If in this proportion you find it of too dark a hue, add as much crystal more as will bring it to the degree you like to have it.

LXXIII. *To make an amethyst.*

To ten pounds of crystal, or transparent pebbles calcined and prepared as before directed (Art. xxiii.) add seven ounces of fusible magnesia, with one of loadstone, and a little zaffar. Mix all well, and put it in the furnace for one month.

If you add to the green composition a little calcined silver, you will see it surprising beautiful.

C H A P. VI.

SECRETS concerning COLOURS and PAINTING.

§ I. *To paint in varnish on wood. (Useful to Carriage Painters.)*

1. *The preparations previous to the laying of colours, and the general process observed in laying them on it.*

1. **Y**OU must first lay on the wood two coats of Troyes-white, diluted with size water. Next lay over these a third coat of ceruse. Then mix the colour you want with turpentine oil, add the varnish to it, and lay it on the wood, previously prepared as follows.

2. Polish the wood, first, with shavegrass or horse-tail, and then with pounce-stone. Lay afterwards six or seven coats of colour mixed with varnish, allowing after each coat a sufficient time to dry, before laying on the next; then polish over the last coat with pounce-stone, grinded on marble into a subtile powder. When this is done, lay two or three coats of pure white varnish. As soon as this is dry, rub it over with a soft rag dipped into fine olive oil, then rub it with tripoly reduced into subtile powder; and having wiped with a clean piece of linen, pass a piece of wash leather all over it.

II. *To make a black.*

1. The black is made with lamp or ivory black, grinded on a marble stone, with vinegar and water, till it

it is reduced into the most impalpable powder. Keep it in a bladder.

2. There is a sort of black which, from its hue, may be termed a velvet black. This is made of sheep trotter-bones, burnt and reduced by grinding, like the other black, into an impalpable powder. Keep it the same as the other.

III. *To make a blue.*

Burnt turnsol mixed with quick lime and water, then sized with leather size, makes the blue.

IV. *To make the Gridelin.*

Grind cochineal with white lead and a little Venetian lake. According as you put more or less of this last ingredient, you make it darker or clearer.

§ II. *To paint on paper.*

V. *For the red.*

To make a red, take flat, or Venetian lake and Brasil wood, and boil all together, with an addition of black lead.

VI. *To make a fine yellow.*

You must boil some kermes in water impregnated with orpine.

VII. *To make a green.*

A mixture of verdigrease, sap green, Hungarian green, and tervette. The whole grinded on marble with a pretty strong leather size.

VIII. *To transfer a print on vellum, and then paint it.*

Chuse your print, and fit a sheet of transparent, or varnished paper to it, for width and breadth. Lay it on the print, and fix it by the four corners and the mid-

idle part of the four edges, on that print, by means of a little white wax, the bulk of a pin's head. Then with a very fine lead pencil, sketch out on the varnished paper, all the outlines and turns of the print which you plainly see through. When done, rub the back of this varnished paper all over with red chalk, and carrying it on the vellum, fix it on it, as you did on the print. Then with a wooden or ivory blunt point pass, over all the strokes which are delineated on the varnished paper, the red chalk of the back will set off in all those parts, and lie on the vellum, whereon you will find the print perfectly sketched, and fit to receive what colours you like.

§ III. Compositions for Limners.

IX. How to prepare colours for limning.

Most colours are prepared, or grinded with gum arabic. Ochre makes the yellow; *courant mourant*, the white; verdigrease, the green; ceruse, the grey; lamp black, the black; cinnabar, the red; and gold in shell, the gold.

X. To make what is called lamp-black.

Put a large wick of cotton in a lamp filled with nut oil, and light it. Prop over the flame an earthen dish, and now and then visit this dish, and gather all the black which fixed itself to it.

XI. Another way of making black.

Burn some nut shells in an iron pan, and throw them in another full of water. Then grind them on marble with either oil or varnish.

XII. To make a blue.

Whitening grinded with verdigrease will make a very fine blue.

XIII. *To make a turquin blue.*

German turnsol infused for one night in chamber-lye, then grinded with a discretionable quantity of quicklime, in proportion as you want to have it paler or darker.

XIV. *A fine green for limning.*

Grind some verdigrease with vinegar, and a very small quantity of tartar; then add a little quick lime and sap-green, which grind with the rest, and put in shells for keeping. If it become too hard, dilute it with a drop of vinegar.

XV. *Another for the same purpose.*

Grind on a marble stone, verdigrease, and a third of tartar, with white wine vinegar.

XVI. *To make Sap-green, or blackberry green.*

Express the blackberry juice, when full ripe. Add some alum to it, put all in a bladder, and hang it in the chimney to dry.

XVII. *To make lake.*

Take three parts of an ounce of Brasil wood; a pint of clear water; one drachm and a half of roch-alum; one dozen and a half of grains of salt of tartar; the bulk of two filberts of mineral crystal; three quarters of a pound of the whitest found, or cuttle-fish bones, rasped. Put all together in a saucepan to boil, till reduced to one third. Strain it three times through a coarse cloth. To make a finer sort, strain it four times. Then set it in the sun under a cover to dry. That which dries the soonest is the finest.

XVIII. *To make a liquid lake.*

Pound some cochineal and alum together; then boil them with a quantity of lemon-peels cut very small. And when it is come to the right colour you want, pass it through a cloth.

XIX. *Another way.*

On a quantity of alum and cochineal pounded and boiled together, pour drop by drop, oil of tartar, till it comes to a fine colour.

XX. *For the vermillion.*

Vermilion becomes very fine in *aquavite*, or in child's urine. But it will be still finer, if you put it in *aquavite* with a little saffron. It is used with whipped whites of eggs.

XXI. *For the making of carmine.*

1. Boil two quarts of spring water in a varnished pipkin; and, when it boils, throw in seven pugils of pulverised *chouam*. After this has thrown two or three bubbles, take it off the fire, and decant it in another clean pipkin. Then put in this water five ounces of cochineal in powder, and boil it for a quarter of an hour. Add three pugils of *autour*, in fine powder, and make it throw four bubbles. Then add three pugils of Roman alum in powder, and take it out directly from the fire, which must be made of live coals.

2. Strain all through a linen cloth, and divide this liquor into several delph vessels, and so let it remain for three weeks. At the end of that term pour off the water by inclination. You will find under a kind of mouldiness, which you must carefully pick off, and then gather the carmine.

Note. Every five ounces of cochineal give one of carmine. It is to be grinded on marble.—A general opinion prevails, that this operation is best done in the crescent of the moon. How far it is needful to observe this precept, is left to the wise to determine.

XXII. *Colours fit for expressing the various complexions.*

1. For women and children; mix a little white and a little turnsol.
2. For men; a mixture of white and vermillion is proper.
3. For old folks; you must use some white and ochre.
4. For

4. For horses ; you must chuse bistre, ochre, and white.
 —The dark brown horses require a little addition of black.
 —The gray want nothing but bistre and white.

§ IV. *To make transparent colours.*

XXIII. *For the green.*

Put in very strong vinegar, verdigrease, rue-juice, and gum-arabic. Set this in the sun for a fortnight, or, if you have no sun, boil it on the fire. Strain it, bottle and stop it—Shake it well before using.

XXIV. *For the red.*

Make a lye with salt of tartar. In it, put to infuse for one night, some India wood, with a little alum. Boil all, and reduce to one third. Run it through a linen cloth, and mix some gum-arabic with it—With more or less alum, you make it of a higher or paler hue.

XXV. *For the yellow.*

Bruise Avignon seed, called *French Berries*, and put it in a lye of salt and tartar to boil on the fire, to the reduction of two thirds. Run it, and boil it one bubble more. Then bottle and cork it—It must be shaken before using
 —A small addition of saffron renders it more lively.

XXVI. *For the blue.*

Soak in chamber-lye, one night, a quantity of German *Palma Christi*. Take it out and grind it with a little quick lime—More or less quick lime will raise or lower it in hue. And nothing more is required to dilute it than chamber-lye and gum arabic.

XXVII. *Another blue, very like ultramarine.*

Grind some indigo on porphyry with turpentine oil. Put it afterwards in a glazed pipkin, and lute it well. Let it thus lay for the space of six weeks. The longer you leave it there, the more blue it will be.

XXVIII. *A pale red, to paint on enamel.*

1. Take the filings of a piece of good iron. Put them in a matrass with *aquafortis*, and set it on a slow fire. Let it boil gently till the filings are all dissolved.
2. When this is done, pour a little warm water into the matrass, and let it remain a few hours on the fire, then pour all into another vessel. When the liquor shall be quite clear, decant it out gently, and leave the powder, which is at the bottom, to dry.
3. Put this dried powder in a new crucible well covered and luted, and then neal it gently on a very regular fire; and, a little while after, take it out and let it cool.
4. Now one drachm of that powder, and three of yellow Dutch beads ground with mastic-oil, will give full satisfaction.

XXIX. *Process of making purple, for painting an enamel.*

1. Take one drachm of very fine gold, forged weak. Cut it in small bits, and neal it. Put that gold into a matrass, with one ounce of ammoniac salt, and two of good *aquafortis*, and set it on a gentle fire to run all into liquor.
2. Have two ounces of clear water, near boiling, and throw it in the matrass. This done, pour the whole in a glass phial of more than a quart size, to which add one ounce and a half of oil of tartar drop by drop. It will occasion an ebullition, which being ceased, you must fill the bottle with water, and let it rest till the gold falls to the bottom.

3. When the water is quite clear, decant it out gently, for fear of disturbing the gold and losing it. Then fill the bottle with new water, repeating this operation till the water is as clear when you decant it out, as when you put it in, and has no more smell.

4. Take your gold out of the bottle, and put it on a fine brown paper, folded in four or five doubles, and turned up by the edges, in form of a little case or mould. There let it dry; and, when dry, keep it for use.

5. Grind,

5. Grind, next, some fine white frost-glass; mix it with water, put it in a bottle, and shake it, then let it settle. When this powder is fallen to the bottom, decant off the water, and let the powder dry in the vessel.

6. The proportion to make the purple colour. Take three grains only of your aforesaid gold dust to thirty of the white frost-glass, thus prepared. Mix both in a calcenedon mortar with clear water. After the powder has settled to the bottom of the mortar, decant out the water, and let the powder dry in the mortar.

7. This done, take the powder out of the mortar, and putting it on a white bit of paper, dry it by a slow fire, till you see it has acquired a fine purple hue.

8. Grind, now, this powder with a little oil of spike, and put it in little cases made with cards, of which the edges are turned up. When the card has soaked the oil, the whole operation is accomplished—Preserve it by putting it in small boxes, in a dry place.

XXX. How to make a fine flesh colour.

9. The mere addition of a little black to the above composition will make the finest colour for complexions, or flesh-colour, and may justly be deemed a ninth article in the process which is to be observed in its fabrication.

XXXI. A good way to make carmine.

Make a little bag, tied very close, of fine Venetian lake. Put it in a little varnished pipkin, with rain-water and cream of tartar, and boil it to a sirup. Thus you will have a fine carmine colour.

XXXII. Another way.

Grind dry, on porphyry, some of *coccinella ursula*, sugar-candy, roch-alum, and gum-arabic, all nearly in equal quantities, except the gum, of which you put a little less. Put these powders into a glass phial, and pour over a sufficient quantity of brandy to cover them, and squeeze over the juice of a lemon. Stop well the bottle, and set it in the sun for six weeks. Run the colour

into shells, taking care that none of the ground should run out with it.

XXXIII. *The whole process of making ultramarine.*

1. Make some of the brownest *lapis* red hot in a crucible, then throw it into vinegar. Repeat this three times. When calcined, pound it in a mortar, and sift it. Then grind it on porphyry, with a mixture of lintseed oil and spirit of wine, in equal quantities, and previously digested together in a matras, and often shaken to prepare them for this use. When you shall have subtilized your *lapis* powder, then incorporate it with the following cement.

2. Lintseed oil, two ounces; Venice turpentine, three; mastich, half a one; *assa fætida*, two; black rosin, as much; wax, half an ounce; yellow rosin, three. Boil all in a glazed pipkin, for a quarter of an hour; then run it through a cloth into clear water. Take it out of that water; and, taking of this, and of the grinded *lapis*, equal quantities, incorporate them in a glazed pan, and pour some clean warm water over, and let it rest for a quarter of an hour. Stir this water with a wooden spatula; and in another quarter of an hour you will see the water all azured. Decant, gently, that water into another glazed pan. Pour new warm water on the grounds, and proceed as before, continuing to stir and beat it well; then decant again this new azured water with the former. Repeat doing so, till the water is no more tainted with any azurine particles—When done, set your azured waters in evaporation, and there will remain at the bottom a very fine Azure of Ultramarine, *viz.* four ounces of it for every one pound of composition. Of the remainder you may make what is called *cender blue*.

XXXIV. *Another very fine ultramarine.*

Take the finest *lapis lazuli* you can find; break it in little bits, and make it red hot in a crucible, between blasting coals. When red hot, throw it in white wine vinegar; then dry it and pound it in a marble mortar with a wooden pestle. Should it not pound easily, calcine it again as before, and throw it again in vinegar,

&c.

&c. then try it in the mortar, and if it do not pound yet, repeat again the same process, till it easily submits to be pulverised. After it has been put into a fine powder, grind it on a porphyry stone, with good *aquavitæ*, till it is impalpable. Then gather it up in little cakes, which set a-drying on paper of slates. When dry, if you pulverise it, you have a fine ultramarine.

XXXV. *A very good and experienced pastil to make ultramarine of—The doses as for one pound.*

Take nut or lintseed oil, three ounces; new wax, and fine rosin, three ounces of each; rosin, one; Burgundy pitch, four; *oliban*, otherwise male frankincense, two drachms; dragon's blood, one. Melt all these ingredients, one after another, in the same order as they are here prescribed. That is to say, put in a varnished pipkin, the oil first; and when a little warm, put in the rosin by little bits. This being dissolved, put in the chalk pulverised, pouring it gently, and by little at a time, lest it should blaze. As soon as the rosin is melted, pour the rosin in powder, and by degrees. Next add the Burgundy pitch, broken in small bits, by little at a time; and when all are introduced and well dissolved, add gradually the dose of dragon's blood powder, and let it dissolve like the other drugs.—Stir this composition with a stick, by means of which you are to judge whether or not your pastil is done. To know it, let a drop fall from the stick into a pan of water; then, working it between your fingers, you see whether or not it stick to them. If it stick, the pastil is not done, and you must let it remain longer on the fire; then repeat the trial till it does not stick to your fingers, as a proof of its being arrived at its degree of perfection.—Throw it in a glazed pipkin filled with cold water; and when it becomes a little cold, make it into a ball with your hands, which you shall have previously greased with lintseed oil. Then you may keep it as long as you please for use. Stay, however, three or four days, before using it the first time.

XXXVI. The way of mixing the lapis with the pastil to make ultramarine.

1. Dilute, as thick as you can, a quantity of the before-mentioned impalpable powder of *lapis lazuli*, with a liquor made of two parts of *aquavite*, and one of lintseed oil.

2. Melt in another glazed pan, without the assistance of water, and over a gentle fire, the pastil described in the preceding receipt.—Observe that your pastil be perfectly purified from any particles of water it might have carried away with it, when you threw it in water in order to form it into a ball.

3. When the pastil is melted, throw into it the thick paste you had previously made of *lapis lazuli* with brandy and lintseed oil. Stir and mix this so well, that the whole be most perfectly united and incorporated. Then let it remain twenty-four hours, and cover it well for fear of dust.

4. After twenty-four hours are elapsed, put in this pan a quantity of lukewarm water, proportionable to that of the matter, and work well the whole together with two wooden pestles, till the water becomes quite blue, which you will immediately decant off into a china basin, and cover carefully for fear of dust.

5. Put new lukewarm water again on the same pastil. Work it anew as before, and proceed the same as the first time.—Repeat this operation as many times as you find the water coming blue, and till you perceive it begins to turn gray or white, which is a convincing proof that there is no more good in the pastil.—Be careful to range in order the different bowls in which you have decanted your tinged waters; and, to avoid mistakes, number them by first, second, third, &c.

6. Let these waters settle, and when quite clear as when you put them in, decant them again with all the gentleness possible, each into another similar vessel, for fear of losing any of the ultramarine which lies fixed all round the sides and bottom of the bowls, and might be, though never so little, carried off with the decanted waters. When these waters are duly decanted off, cover again, carefully, the bowls, for fear of the dust, and let the ultramarine,

tramarine, which lies round them, dry perfectly. When dry, brush it down gently to the bottom, with a new soft hair brush, and gather your powders separately with the same numbers on each parcel, agreeable to that of the bowls, whence they come.

7. The first ultramarine is the finest; the second is not so much so as the first; neither is the third so fine as the second. And it goes thus, decreasing in beauty, merit, and value.

Observations on the above process.

1. Ultramarine might be drawn from the pastil, by working it with the hands instead of pestles. But, as it fatigues a great deal more the articulations by that sort of working, than by the other, there is room to think, that by this mode of proceeding, each single operation might be attended with some imperfection; which is the reason why the pestles are preferable.

2. Some people make their *lapis* red-hot on bare coals, then steep it in distilled vinegar, repeating this several times till it becomes fryable.

3. But it is much preferable to make it red hot in a crucible; because, should the fire make it split, the bits will remain in the crucible. Now it need not be wondered at if it does, particularly when calcinations are often repeated.

4. The *lapis*, which is of a fine blue, and striped with gold or silver, is the best to make ultramarine of.

5. The *lapis* is also reckoned to be of a good quality, when it preserves its fine colour, even after it has been made red-hot in blasting charcoals.

XXXVII. *Another secret to compose a fine blue, for washing, in drawings, instead of ultramarine, which is too dear, and too strong to be used for that purpose.*

1. Gather in the summer, a large quantity of blowart, which grows in the fields among the corn. Pick well their blue leaves off. Have lukewarm water impregnated with impalpable powder of alum. Put the picked blue leaves into a marble mortar, with a sufficient quantity of that

that alum water, to soak them only. Then, with either a wooden or marble pestle, pound them, till the whole is so mashed, as to give the juice by expression through a new cloth. Then strain it over a glass bowl, in which there is water impregnated with the whitest gum-arabic you can find.

2. Observe that you must not put much alum in the first water, if you are desirous of preserving the brightness of the colour: for by putting too much of that ingredient, as well as for the water impregnated with it, you darken the tone of the colour.

3. Note. By means of the same process, you may likewise draw the colours from every flower which has any great eclat. You must not neglect to pound them with alum water, which prevents the colour from suffering any alteration; as it sometimes happens at the very first bruise.

4. To render these colours portable, set them a-drying in the shade, in glass vessels, well covered, to fence them against the dust.

XXXVIII. *The true secret of making Iris-green.*

1. Take a large quantity of the flowers of that name in the spring. Pick them; that is to say, pick out the green and the yellow, which are at the bottom of the petal of the flower. Next to this, pound them in a marble mortar, with a little lukewarm water, impregnated with alum. When pounded, express the juice through a new cloth, over a china bowl. Then mix some gum-arabic water with it.

2. If you want a tone of colour different from the natural colour of the flower, you may change it by only adding, after the flowers are pounded, a little quick-lime-dust in the mortar, and give two or three strokes of a pestle more to the whole; then strain it.

3. Note. If you should pound these flowers in a wooden mortar, you must be cautioned at least to take care it should not be one of walnut-tree wood, because it is apt to tarnish the colours, and destroy their brightness,

ness, which is one of the chief things always required in colours.

4. In the month of March, you may by means of the same process, obtain the colour from garden, or double violets. But this is never so fine nor so lively.

XXXIX. To make a dark green, for miniature pictures, washing on paper, on draperies and terraces.

Take, towards the end of autumn, a good quantity of wallwort stalks, with their fruits on them, and very ripe. Let them rot for five or six days in the cellar; and when you see the fruits have fermented sufficiently to give easily their juice by expression, strain it through a new cloth in alum-water. Divide the whole into several glass tumblers, to dry it more easily. Set them in the air, but not in the sun, and lay some paper over them to prevent any thing from falling into the glasses, but which should not at the same time stop the exhalation of the liquor, and thereby cause it to become mouldy. By these means, you shall have a colour fit for the wash of a green hue, and dark at the same time.

XL. To make the Bistre for the wash.

1. Grind, on marble, with child's water, some chimney-foot. Mullar it as fine as possible. When done, put it in a wide-mouthed bottle, which fill up with clear water; and then, stir and mix all well with a wooden spatula. Let the coarsest parts settle to the bottom of the vessel. Decant out the liquor gently into another vessel. What remains in the bottom is the coarsest bistre.

2. Proceed the same with respect to the second bottle, and after having left this to settle for three or four days, instead of half an hour, decant it into a third. This gives you the finest bistre.

3. In the manipulation of all the colours which are intended to serve in drawing for wash whenever you will not have them rise thick above the surface of the paper, which would undoubtedly look very bad; for the neatness required in a draught, forbids the use of any coarse colour.

XLI. *The secret for a fine red for the wash.*

1. Make a subtile powder with cochineal. Put it in a vessel, and pour rose-water over it as will exceed above it by two fingers.
2. Dilute calcined and pulverised alum, while it is quite warm, into plantain water, and mix some of the liquor in which you have dissolved the cochineal.
3. This proceſſ will give you a very fine red, much preferable for the wash, to that which is made with vermillion, because this laſt has too much conſiſtence, and beſides tarniſhes too ſoon, on account of the mercury which enters into its composition.

XLII. *A ſecret to make carmine at a ſmall expence.*

Break and bruise in a bell-metal mortar, Half a pound of gold colour Fernambourg-Brasil. Put this to infuse with diſtilled vinegar in a glazed pipkin, in which boil it for the ſpace of a quaſter of an hour. Strain the liquor through a new ſtrong cloth: then ſet it again on the fire to boil. When it boils, pour on it white-wine vinegar, impregnated with Roman alum. Stir well with a wooden ſpatula, and the froth that will arife is the carmine. Skim it carefully in a glass vessel, and ſet it to dry.

§ V. *Composition of colours, to dye ſkins or gloves.*XLIII. *A lively Isabel.*

To make a lively Isabel colour, you muſt, to a quaſtity of white, add one half of yellow, and two thirds of red and yellow.

XLIV. *For a pale filbert colour.*

1. Take burnt umber; a little yellow, very little white, and ſtill leſs red.
2. This is made darker, by adding a quaſtity of burnt umber, as much yellow, a little white, and as much red.

XLV. *For*

XLV. *For the gold colour.*

To much yellow, join a little more red ; and this mixture will give you a very fine bright gold colour.

XLVI. *For the flesh colour.*

To imitate well the complexion, or flesh colour, you mix a little white and yellow together, then add a little more red than yellow.

XLVII. *The straw colour.*

Much yellow ; very little white ; as little red, and a great deal of gum.

XLVIII. *A fine brown.*

1. Burnt umber ; much black chalk ; a little black, and a little red ; will make a fine brown, when well incorporated together.

2. The same is made paler, by decreasing the quantity of black chalk, and no black at all in the above composition.

XLIX. *To make a fine musk colour.*

Take burnt umber ; very little black chalk ; little red and little white. These ingredients well mixed will produce as fine a musk colour as ever was.

L. *To make a frangipane colour.*

1. This is made with a little umber ; twice as much red, and three times as much yellow.

2. The paler hue of it is obtained by adding only some white, and making the quantity of red equal to that of yellow.

LI. *An olive colour.*

To make the olive colour, take umber, not burnt ; a little yellow ; and the quarter part of it of red and yellow.

LII. *How*

LII. How to make skins and gloves take these dyes.

Grind the colours you have pitched upon with perfumed oil of jessamine, or orange flowers. Then range the grinded colour on a corner of the marble stone. Grind of gum-adragant, an equal quantity as that of the colours, soaking it all the while with orange flower water. Then grind both the gum and the colour together, in order to incorporate them well.—Put all into a pan, and pour a discretionable quantity of water over it, to dilute sufficiently your paste. Then with a brush, rub your gloves or skins over with this tinged liquor, and hang them in the air to dry. When dry, rub them with a stick. Give them again, with the same brush, another similar coat of the same dye, and hang them again to dry. When dry for this second time, you may dress them, the colour is sufficiently fixed, and there is no fear of its ever coming off.

LIII. To varnish a chimney.

Blacken it first with black and size. When this coat is dry, lay another of white lead over it, diluted in mere sized water. This being dry also, have verdigrease diluted and grinded with oil of nuts and a coarse varnish, and pass another coat of this over the white.

§ VI. To colour, or varnish copperplate prints.

LIV. To varnish copperplate prints.

1. Have a frame made precisely to the size of your print. Fix it with common flour-paste, by the white margin on that frame. Let it dry, then lay the following transparent varnish on it, which is to be made without fire.

2. Dilute in a new glazed pipkin, with a soft brush, as big as your thumb, about a quarter of a pound of Venice turpentine, and twopenny worth of spike, and turpentine oils, and half a gill, or thereabouts, of spirit of wine.—This varnish being no thicker than the

the white of an egg, lay with your brush, a coat of it on the wrong side of the print; and, immediately another on the right. Then set it to dry, not upright, but flat. And, if it should not dry quick enough, pass a light coat of spirit of wine on the whole.

LV. *How to colour these prints, in imitation of pictures in oil colours.*

1. To paint these prints, you must work them on the back in the following manner. Prepare first your colours on a pallet, and then proceed thus:

2. The flesh-colour is made with a little white and vermillion, which mix with your pencil according to the degree of redness you will have it.—For the green of tree-leaves, you must have mountain-green, ready prepared from the colourman; and for the finest green, some verdigrease. As for the lighter shades of these colours, you only add some yellow to either of the above two, more or less, according to the circumstances.—To paint woods and trunks of trees, nothing more is required than umber.—To express sky-colours and clouds, you mix some blue ceruse with white lead; and with these two colours only, you alter your blues to various degrees of shades, diminishing or augmenting one of the two, according to the darkness or lightness of the skies which you want to express. For the distances, a mixture of yellow and white lead, and so on for the other colours you may want.

3. You are to compose them yourself on the pallet with the pencil; and to mix or unite them, use a little oil of nuts, which take up with the point of the pallet-knife. Then with the pencil, you apply them on the wrong side of the print.

LVI. *A varnish which suits all sorts of prints and pictures; stands water, and makes the work appear as shining as glass.*

Dilute one quarter of a pound of Venice turpentine, with a gill, or thereabouts, of spirit of wine. If too thick, add a little more of this last; if not enough, a little of the former, so that you bring it to have no more thickness

thickness than the apparent one of milk. Lay one coat of this on the right side of the print, and when dry, it will shine like glass. If it be not to your liking, you need only lay another coat on it.

LVII. To make appear in gold the figures of a print.

1. After having laid on both sides of the print, one coat of the varnish described in the above *Art. Ivi.* in order to make it transparent, let it dry a little while. Then before it is quite so, lay some gold in leaves on the wrong side of the print, pressing gently on it with the cotton you hold in your hand. By these means all the parts, whereon you shall lay these gold leaves, will appear like true massive gold on the right side.

2. Now when this is all thoroughly dry, lay on the right side of it, one coat of the varnish described in the preceding *Art. Ivi.* it will then be as good as any crown-glass. You may also put a paste board behind the print, to support it the better in its frame.

LVIII. A curious secret to make a print imitate the painting on glass.

Chuse a crown-glass of the size of your print; and lay on it two coats of the following varnish:

1. Put on the fire, in a glazed pipkin, and let boil for the space of one hour. Venice turpentine, four ounces; spirit of the same, and of wine, equal parts, one ounce and a half of each; mastich in tears, two drachms.

2. After it has boiled the prescribed time, let it cool, and then lay the first coat on the glass; this being dry, lay another; and, as soon as this is nearly dry, then lay on it, as neatly as possible, the print, previously prepared as follows.

3. Have a glazed vessel so broad at bottom as to admit of the print flat with all ease in its full size. Let this vessel be also as wide at top as it is at bottom, that you may get the print in and out of it on its flat, without bending it in the least. Pour *aqua-fortis* in this pan or vessel, enough to cover all the bottom, then lay the engraved

graved side of your print on that *aqua-fortis*. Take it out and wipe the *aqua-fortis* off gently with soft rags, then steep it two or three times in three different clean fresh waters, and wipe it each time in the same manner.

4. This being done, lay the right side on the before-mentioned glass, before the second coat of varnish be quite dry, and while it is still moist enough for the print to stick upon it uniformly, equally, and smoothly, without making any wrinkles or bladders. When it is perfectly dried in that situation, wet your finger in common water, and moistening the print on the back part in all the white places, which have received no impression from the engraving of the plate, rub it all off. By these means, there will remain nothing but fairly the printed parts. On them you may paint in oil with a brush, and the most bright and lively colours; and you will have pictures, on which neither dust nor any thing else will be able to cause any damage. To do this, there is no need of knowing, either how to paint or draw.

LIX. *Another to the same purpose.*

1. Heat before the fire, a crown glass of the size of the print, and then rub it over with Venice turpentine, which, on account of the heat of the glass, will spread the more easily.

2. Boil next your intended print in spirit of wine, for about half a quarter of an hour; and then lay it by the right side on the glass.

3. This glass being cold, wet your finger, and moistening the back of the print, scrape with your nail, the paper off the glass, so that there remain nothing but the strokes of the engraving.

4. Boil in a matras, for about a quarter of an hour, or rather more, and in *balneo mariae*, one part of turpentine with four of spirit of wine. Then lay two coats of this composition on the back of the print, after you have scratched off all the paper, and allowing time between each coat to dry.

5. As soon as the second coat is dry, you may lay on water-

water-colours on the print, according to taste and judgment, agreeable to the beauty of the prints used.

LX. The method of chalking, for those who are not acquainted with drawing.

They who are not acquainted with the principles of drawing, may amuse themselves with chalking some beautiful prints, on white paper, where they shall have nothing more to do afterwards than shade, in the same manner as they see done in the original. When they shall have practised for a while in that way, they will soon become able to strike out themselves some good piece or design. And to obtain that point, the following method is recommended.

1. With a soft, and one of the best black lead pencils, rub one side of a white sheet of paper, cut to the size of the print, so that nothing of the paper can be seen, and only the black lead colour.—Lay this sheet on the clean side, upon the face of the print, that it may not soil it; and on this sheet, the black side of which now lies uppermost towards you, lay another sheet of clean paper, and fix these three sheets together by the four corners, and on the edges with fine pins, so that the sheets may not vary one from another, which would quite confuse and mar the whole design.

2. Now take a blunted needle, or ivory point, and slip it, in pressing gently all over the turns of the prints, going gradually and orderly for fear of forgetting some places, which may be prevented by laying a flat ruler across the print under your hands. When the whole is finished, unpin the papers; and, on the under part of that which lays at top, you will find all the outlines of the print most exactly drawn.

3. You may now on these outlines, pass a stroke with India ink and a brush, or with ink and a pen; after which, with a crumb of stale bread, you rub off clean all the useless marks of the pencil, and leave none but those marked with ink. And to shade this design, wash it with India ink, or colours, and a brush.

LXI. *To prepare a transparent paper to chalk with.*

In order to obtain the art of chalking neatly, and not to go out of the fine turns and outlines of a drawing, beginners should first know how to prepare a transparent paper, which, as it lets them see the minutest parts of the strokes as through a glass, gives them of course an opportunity of acquiring by practice, a correctness in the expression of all the turns of drawing. This preparation is as follows.

1. Have, one or several, sheets of fine and very thin paper, and rub them over with oil, or spirit, of turpentine, mixed in double the quantity of oil of nuts. To cause the paper to imbibe that mixture, steep a sponge or feather in it, which pass on both sides of the paper, and then let it dry.

2. When you want to use it, lay it on a print. Then, with a brush, a pencil, or a pen, pass over all the strokes, lines, and turns, of the design laid under. You may even thus learn to shade with neatness, if you wash that same design, while fixed on the original print, with India ink.

By practising often you may learn to draw very neatly, and even with boldness. This method will certainly prove very useful, and entertaining, for those who have not the patience to learn by the common method, which seems too tedious to some, and generally disgusts beginners.

§ VII. *For painting on glass.*

LXII. *How to draw on glass.*

Grind lamp-black with gum water and some common salt. With a pen or hair pencil, draw your design on the glass, and afterwards shade and paint it with any of the following compositions.

LXIII. *A colour for grounds on glass.*

1. Take iron filings and Dutch yellow beads, equal parts. If you want it to have a little red cast, add a little copper

copper filings. With a steel muller grind all these together on a thick and strong copperplate, or on porphyry. Then add a little gum-arabic, borax, common salt and clear water. Mix these a little fluid, and put the composition in a phial for use.

2. When you come to make use of it, you have nothing to do but with a hair pencil lay it quite flat on the design you had drawn the day before; and having left this to dry also for another day, with the quill of a turkey, the nib of which shall not be split, you heighten the lights in the same manner as you do with crayons on blue paper. Whenever you put more coats of the above composition one upon another, the shade, you must be sensible, will naturally be stronger. And when this is finished, you lay your colours for garments and complexions as follows.

LXIV. Preparation of lake, for glass.

Grind the lake with a water impregnated with gum and salt; and then make use of it with the brush—The shading is operated by laying a double, treble, or more coats of the colour, where you want it dar'ker. And so it is of all the following compositions of colours.

LXV. Preparation of the blue purple, for glass.

Make a compound of lake and indigo, grinded together with gum and salt water; and use it as directed in the preceding article.

LXVI. Preparation of the green for glass.

Indigo mixed with a proportionable quantity of gamboge, and grinded together as above, will answer the intended purpose.

LXVII. Preparation of the yellow for the same.

Gamboge grinded with salt water only.

LXVIII. Preparation of the white.

You have only to heighten much the white parts with a pen.

LXIX. The

LXIX. *The proper varnish to be laid on glass after painting*

Boil oil of nuts, some litharge, lead filings, and white copperas calcined. When done and cold, lay it all over the colours which you put on the glass.

LXX. *How to paint on glass without fire.*

Take gum arabic and dissolve it in water with common salt, bottle, and keep it. With this liquor, if you grind the colours you intend to paint with, they will fix and eat in the glass. Should you find they do not enough, increase only the dose of salt.

§ VIII. *Preparations of colours of all sorts for oil, water, and crayons.*LXXI. *An oil to grind colours with, when the works are much exposed to the injuries of the weather.*

Take two ounces of mastich in drops, very clear, and grind it with linseed oil. Then put in a well glazed pipkin any quantity of that oil, and set it on the fire to boil. By little and little introduce in that boiling oil the above prepared mastich, stirring well the whole to mix and incorporate the better. When done, take it from the fire, and let it cool,—Such is the preparation of oil with which you are to grind your colours, when they are to be much exposed to the injuries of the weather, for they will resist it.

LXXII. *To marble and jasper paper.*

1. Grind all the colours you want to employ (such as lake, masticot, indigo, yellow and red ochre, &c. &c.) with bullock's gall; grind each separately, and keep them so. Then have a large and wide pan filled with luke-warm gum water. Stir well that water with a stick. While it is in motion, and your colours being ready under your hand, with a large brush, take of each separately, as much as the tip of the brush will carry, and touch

only the surface of the water with it. The colours will immediately expand. Each colour requires a particular brush to itself. Therefore, with another brush, take of another colour, and do the same; and, with another of another, and so on, till you have put on your water all those you have destined for the purpose.

2. When the water ceases to turn, you will plainly perceive all the variety occasioned by the different colours. Then, taking your sheet of paper, lay it flat on the water, leave it there for about two or three minutes, and, without taking it out, give it one turn round on the water, then pull it by one of the edges to the side of the pan, wash it, dry it, and burnish it afterwards.

Note. The paper must be chosen good, and the water fixed with gum-adragant.

LXXIII. *To clean pictures.*

Take the picture out of its frame. Lay a clean towel on it, which for the space of ten, fourteen, or eighteen days, according as you find it necessary, you keep continually wetting, till it has entirely drawn out all the filthiness from the picture. Then, with the tip of your finger, pass some linseed oil which has been set a long while in the sun to purify it, and the picture will become as fine as new.

LXXIV. *Another for the same purpose.*

Put into two quarts of the oldest lye one quarter of a pound of Genoa soap, rasped very fine, with about a pint of spirit of wine, and boil all together on the fire. Strain it through a cloth, and let it cool. Then with a brush dipped in that composition, rub the picture all over, and let it dry. Do the same again once more, and let it dry too. When dry, dip a little cotton in oil of nut, and pass it over all the picture. Let this dry again; and, afterwards, warm a cloth, with which rub the picture well over, and it will be as fine as just out of the painter's hands.

LXXV. *A*

LXXV. *A secret to render old pictures as fine as new.*

Boil in a new pipkin, for the space of a quarter of an hour, one quarter of a pound of gray or Bril-ash, and a little Genoa soap. Let it cool, to a lukewarm, and wash your picture with it, then wipe it. Pass some olive oil on it, and then wipe it off again. This will make it just as fine as new.

LXXVI. *An oil to prevent pictures from blackening. It may serve also to make cloth to carry in the pocket, against wet weather.*

Put some nut, or lintseed oil, in a phial, and set it in the sun to purify it. When it has deposited its dregs at the bottom, decant it gently into another clean phial, and set it again in the sun as before. Continue so doing, till it drops no more *fæces* at all. And with that oil, you make the above composition.

LXXVII. *A wash to clean pictures.*

Make a lye with clear water and wood ashes; in this dip a sponge, and rub the picture over, and it will cleanse it perfectly—The same may be done with chamber-lye only; or otherwise, with white wine, and it will have the same effect.

LXXVIII. *Another way.*

Put the filings in an handkerchief, and rub the picture with it. Then pass a coat of gum-arabic water on the picture.

LXXIX. *Another way.*

Beat the white of an egg in chamber-lye, and rub the picture with it.

LXXX. *A very curious and simple way of preventing flies from sitting on pictures, or any other furniture, and making their dung there.*

Let a large bunch of leeks soak for five or six days in a pailful of water, and wash your picture, or any other

piece of furniture, with it. The flies will never come near any thing so washed. This secret is very important and well experienced.

LXXXI. *To make indigo.*

Put some *isatis*, otherwise woad, or *glastum*, with slack'd lime, to boil together in water. There will rise a scum, which being taken off, and mixed with a little starch, makes the indigo.

LXXXII. *To make a yellow.*

What the *luteola* dyes yellow, becomes green by the woad, or *glastum*. Whence we may justly conclude, that green is not a simple colour, but a mixture of blue and yellow; as the yellow itself is a compound of red and white.

LXXXIII. *An azure of mother-of-pearl.*

Take any quantity of superfine tested silver in laminas. Put it a little while in vinegar; then, take it out, strew over the laminas some pounce powder to alcoholise them. Next stratify them in a crucible; and when red hot, take them off from the fire, and you will have a fine azure.

LXXXIV. *A white for painters, which may be preserved for ever.*

Put into a large pan three quarts of linseed oil, with an equal quantity of brandy, and four of the best double distilled vinegar: three dozen of eggs, new laid and whole; three or four pounds of mutton suet, chopped small—Cover all with a lead plate, and lute it well. Lay this pan in the cellar for three weeks, then take skilfully the white off, then dry it. The dose of the composition for use is six ounces of that white to every one of bismuth.

LXXXV. *Another white for ladies paint.*

To four parts of hog's lard add one of a kid. Melt them together, then wash them. Re-melt and wash them again.

again. Then add four ounces of ammoniac salt, and as much of sulphur, in subtile powder. This white will keep a long time.

LXXXVI. *A good azure.*

Take two ounces of quicksilver; sulphur and ammoniac salt, of each one ounce. Grind all together, and put it to digest in a matrass over a slow heat. Increase the fire a little; and, when you see an azured fume arising, take the matrass off from the fire. When cool, you will find in the matrass as beautiful an azure as the very ultramarine itself.

LXXXVII. *An azure from silver, done in less than a fortnight.*

Dissolve in very strong vinegar, as much gem-salt and roch-alum, as it will dissolve. Put this in a new pikkin; and over it hang up laminas of the finest tested silver. Cover the pot; and lute it well. Bury it in the cellar; and ten or fifteen days afterwards take off the azure, which you will find about the laminas. Replace things as before; and, ten days afterwards, the same again; and repeat this process as many times as you can get any azure by it.

LXXXVIII. *To make an azured water.*

1. Gather wallwort grains between green and ripe, and bake or stew them in a pan. When they have boiled a considerable time, strain them through a cloth, and keep the juice in a glafs phial; its colour will never change, and will keep for ever very fine.

2. Have next dog's dung very dry. Pulverise it very fine, and fist it through a silk sieve. Then grind it on a marble with the wallwort juice, and a mullar, as painters do their colours, and you will find this paste of a very fine azure colour.

3. Now, if you tinge any water with this, by putting it in a phial to soak, you may dye whatever you will with it, such as thread, cotton, cloth, &c.

LXXXIX. *Another way of making azure.*

Take the bulk of a filbert of ammoniac salt, which dissolve in a common half pint glass tumbler of water. Then pound and sift, all together, one ounce of vitriol and one and a half of quick lime. Put this powder into the water in which the ammoniac salt was dissolved. Leave this to infuse for the space of forty-eight hours, and at the end of that term the azure shall be done.

XC. *A fine azure.*

Make an incorporation of three ounces of verdigrease, and of an equal quantity of ammoniac salt, which dilute with tartar water, so as to make a thick paste of it. Put this composition into a glass, and let it rest for a few days, and you will have a fine azure.

XCI. *Another way.*

Pulverise and mix well together one part of ammoniac salt, and two of verdigrease, with a little ceruse. Then pour over it oil of tartar enough to make a clear paste of it. Put this in a glass vessel, which take care to stop and lute well. When done, put it in an oven along with the bread, and take it out with it also, then the azure will be done.

XCII. *Another way.*

Take sublimed mercury, four parts; ammoniac salt, two; sulphur *vivum*, one. Pulverise the whole, and put the powder in a matrass, which lute well with the lute of sapience. Put this matrass on a mild and slow fire; and, when you see a white fume beginning to rise, stop the fire. When the matrass is cold, break it, and you will find a very fine azure at the bottom. Now take it and work it with lukewarm water first, and then with cold.

Note. There are some who absurdly wash it with lye, or a strong lime-water; but they spoil their azure entirely. —What is most adviseable, and indeed the only preparation allowable, is to boil a little white honey in the water, and

and skim it; and when that water becomes lukewarm, wash the azure with it. This may contribute to give it a fine colour, but the other will certainly hurt it.

XCIII. *To make an admirable white lead, fit for oil painting and colouring of prints.*

Grind the finest white lead in flake you can find, on the stone with vinegar. It will immediately turn black. Wash it well in a panful of water, and let it settle. Pour the water off by inclination, and grind it again with fresh vinegar, then wash it a-new. Repeat this operation four or five times, and you will get a most beautiful white.

XCIV. *The preparation of verdigrease.*

Grind the verdigrease with vinegar, and put it in a piece of brown bread dough. Bake it as you would bread; and when done, cut it open and take it out. You will then have a very fine verdigrease, fit to work with, either in oil or water, as you like.

XCV. *A fine liquid green.*

Mix well together, one pound of Montpelier verdigrease, and half a pound of white tartar from the same place. Put this a-soaking for twelve hours in two quarts of the strongest vinegar, then reduce it by boiling to one half. Let it rest for two days, and filter it afterwards in a bottle, wherein you will keep it for use.

XCVI. *To make the Stil-de-grain, or Brown pink.*

Bruise and boil in three quarts of water, four ounces of French berries, to the reduction of one half. Strain all through a cloth, and put in this juice a discretionary quantity of whitening, pounded and sifted into a subtile powder, so as to make a thick paste, which put into small tied bags, and set to dry on tiles. When dry, it is used with gum. And to render it finer, you may put some gamboge.

XCVII. *To make a fine vermilion.*

Make a mixture of cochineal powder and burnt alum. Stifle it quite hot in rose or plantain water. It will give you the finest vermilion in the world.

XCVIII. *A secret to draw without either ink or pencil.*

Rub a sheet of paper with tripoly. Then, with any blunt point, form your drawing on it. Whatever you trace will be visible.

XCIX. *To make an imitation of enamel on tin, for chimney-branches, &c.*

Get a sheet of block-tin very clean, and cut it in the form, shape, and figure you chuse to make your flowers and other things. Grind what colours you propose to make use of, with clean water, and each separately, then let them dry. When you want to employ them, dilate them, each apart, with liquid varnish, and lay them on with the brush. Set the work in the open air for fear the colours should run, and when they are a little thickened and consolidated, finish drying them before a gentle fire.

C. *A valuable secret to make exceeding good crayons, as hard as red chalk, discovered by Prince Rupert, brother to Prince Palatin.*

Grind on the stone, some tobacco-pipe clay, with common water, so as to make a paste of it. Then take separately each colour, and grind them, when dry, on the stone, so fine as to sift them through a silk sieve. Mix, of each of the colours, with your first white paste, as much as will make it of a higher or paler hue, and embody the whole with a little common honey and gum-arabic water.

Note. You must be attentive to make crayons of various degrees of hues in each colour, for the *chiaros* and *oscuros*, or lights and shades. Then roll each crayon between two boards very clean, and set them to dry on paper for two days in the shade. To complete their drying, lay them in the sun ; and then you may use them with satisfaction.

CI. *To*

CI. *To render the stone-cinnabar and vermillion finer; and, at the same time, to prevent them from blackening.*

1. You raise the hue of the stone vermillion, if, in grinding it, you add gamboge water, tinged with a little saffron. This preparation extends only to the red.

2. With respect to the orange colour, you must add some minium to it.

3. For the yellow, put a discretionary quantity of orpine in cakes, prepared as follows—Take the finest orpine you can find, and grind it well with water. Make it in little cakes, and set it to dry on paper. When dry, pulverise and use it.

4. For the gridelin, take French sorrel and boil it in water, to draw as strong a tincture from it as you possibly can. Then have white lead, (dried in cakes, and prepared after the method abovementioned for the orpine) and grind it a new with this sorrel tincture, then dry it. Grind and dry it again, and repeat this operation with the sorrel tincture, till you have obtained the desired point of colour.

CII. *Process used in making Eastern carmine.*

1. Have a two quart glazed pipkin, quite new, Wash it with boiling water, then fill it with water, very clean and filtered. Set it on blasting coals, and when it begins to boil, throw in a drachm of *chouan* in fine powder, which boil very quick for near a quarter of an hour. Then strain this water through a cloth washed in lye, but not with soap, and receive it in another new glazed pipkin, washed as the first. Put this on a fire, not quite so blasting as the first; and, when it begins to give signs of boiling, throw in one ounce of the finest cochineal, pulverised very fine. Stir often with a hazel stick, stripped of its peel, and let boil gently for near a quarter of an hour; then throw in sixty grains of *autour* in subtile powder, and keep it boiling for half a quarter of an hour. Take it off from the fire, and throw in sixteen grains of Roman alum in powder, then strain it immediately through a clean cloth, washed with lye, and no soap, and receive it in two dif-

ferent large china bowls, new and perfectly clean. Place these in a room, where they will be perfectly free from dust, and let them rest there for a week, that the carmine may have time to make a precipitation.

2. At the end of this term, decant out gently your tincture into two other China bowls, of the same size as the two former, and as perfectly clean, taking great care in decanting, to do it so gently that the liquor may not carry the carmine along with it. Then dry in a shade the carmine, which is left in the bottom of your bowls, gather it with a little brush, and keep it very cleanly.

3. Eight or ten days afterwards, more or less, decant again the tincture which is in the second bowl into a new varnished pipkin, then dry and gather the carmine, which is at the bottom, in the same manner as the first.

4. Then set the pipkin, in which the carmine has been decanted for this second time, on the fire, and vapourise the liquor gently, till the ground remains in the consistence of a pap. This pap-like ground must then be put into several small china cups, and placed in the sun to dry, which will procure you again another carmine, darker and much less valuable than the first. Should there happen any moistness on your last cups, take it off immediately, but gently, and with a great deal of care.

5. In order to take the water off from your china bowls, you might make use of another method, *viz.* a very fine and clean sponge, in the following manner. Dip your sponge into very clear and pure water, and there work it well with your hand, soaking and pressing it alternately, till you have rendered it very soft. Then press and squeeze it dry in a clean towel. Now, if you only approach it to the superfice of the tinctured water, it will immediately fill itself with it, and you may squeeze it into another empty bowl, thus repeating the same process, till you have got it all out of the first bowls; taking care every time you approach it to the surface of the water, lest it should touch the carmine; for no doubt but it would carry some along with the water.

6. If you dissolve one drachm of mineral crystal into this tincture, by boiling it to that effect for five or six minutes,

minutes, it will help a great deal the precipitation of the colour, from which you take out afterwards the water with a sponge, as we said before. Should the water you have thus drawn out be still tinged, you may add some more mineral crystal to it again; boil it as before, strain it through a cloth, and let it settle. By these means you will have very fine crimson carmine.

CIII. *The process observed in making the lake.*

1. Take one pound of Alicant kali, or Bril-ash, pulverised, which put in a kettle with four quarts of spring water. Boil the whole for the space of a quarter of an hour, keeping stirring all the while with a stick, then take it from the fire, and let it cool, so as to be able to keep your finger in it without scalding. When it is in that state, throw it in a jelly-bag, made of cloth, to filter it, and render it perfectly clear. Put it, next, in a new glazed pipkin, with one ounce of finely pulverised cochineal, previously diluted by degrees with some of the same lye. Set it a-boiling for half a quarter of an hour, and never cease to stir it with a stick all the while it is on the fire—You may, if you chuse, add one drachm of *serra merita* in fine powder, at the same time with that of the cochineal; it will render your lake the redder—When the whole shall have boiled the prescribed time, take it off the fire, and let the tincture cool, in order to pass it through a cloth, or the above-mentioned jelly bag. Set a large stone pan under the bag to receive the tincture which shall filter; and, when all is well drained, take the bag, turn it to throw off all the dregs, and wash it well, inside and outside, in clear water, and wring it quite dry.

2. Now hang again this same bag at two feet distance, or thereabouts, above the pan wherein the tincture did run, and now is. Dissolve, in about two quarts of warm spring water, six ounces of Roman alum well pounded, that it may more readily melt. When this dissolution is no more than lukewarm, have somebody to pour it for you in the above jelly-bag, while you stir with a stick what runs from it into your tincture, and do so till the

who's is passed through, and the tincture froths no more. — Then wring well your bag again, to express all the alum's dissolution from it into your tincture, and wash it again afterwards in clear water, as before.

3. Have another stone pan like the first, hang your bag again over it, and pour all your tincture in it. If it run clear like water, you may then let it go so; if not, put it again in the bag over the other, and continue so to do till it absolutely does run clear. If, however, after having repeated this three or four times, it should continue to run tinged, dissolve two or three ounces more of pulverised Roman alum in about two quarts of that tinged water, then stir and mix it well in the whole quantity of tincture, then pour it again in the bag where the lake is, re-pouring again and again what shall run first from it, till it runs quite clear, and does not even stain the paper.

4. Then let drain well the lake which is in the bag; and, with a box-spoon take it, and spread it on pieces of cloth, laid on plastered stones, and let it dry in the shade where there is no dust, or where, at least, you may preserve it from any.

CIV. *To make the fine columbine lake.*

1. Take half-a-pound of the finest Brasíl wood you can find. Cut it in small bits, and pound it in an iron mortar. Put this in a new glazed pipkin; pour over it two quarts of strong wine vinegar. Let this infuse without the assistance of any heat for three whole days. Boil it next for half an hour, then add one ounce of pulverised Roman alum, and boil it again for the space of three quarters of an hour, that the alum may the more perfectly be dissolved, and the stronger the colour.

2. Take the pot off the fire; and rasping the softest part of a dozen cuttle-fish bones, add this powder to it. Replace the pot on the fire, and stir the contents till you see a froth rising on the composition; when immediately taking the pot off from the fire again, cover with its lid, and let it stand for a week. During that space of time you must, however, carefully stir this matter four times a day.

3. Have

3. Have next a glazed pan, filled with dry sand as high as three fingers from the brim. In this sand put your pot half way in. Place all on a charcoal fire, till it nearly boils; then, taking the pot off from the fire, run the liquor through a clean cloth. Put it in different retorts, and set them half way in the sand again, which, by this time, ought to be quite cold. Replace all on the fire as before, and keep it there till it begins to simmer; then, taking it from the fire, let it cool, and the lake is done. But it must not be used till twelve days after.

Note. When the tincture is in the retorts, you may put in each of them half a gill of lye, made with vine branch ashes — When you put the powder of cuttle-fish bones in the tincture, you must take care it is warm. — The residue which is found at the bottom of the retorts ought not to be thrown away, as it is very good to paint in water colours.

CV. *A fine red water, for miniature painting.*

1. Put in a new glazed pipkin one ounce of *Fernamburg Brasil* wood, finely rasped. Pour three pints of spring water on it, with six drachms of fine white ifinglass chopped very small. Place the pot on warm ashes, for three days, during which you are to keep up the same degree of heat.

2. When the ifinglass is melted, add two ounces of kermes in grain, one of alum, and three drachms of borax, well pounded. Boil this gently to the reduction of one half; then strain the liquor through a cloth, bottle and stop it well, and set it in the sun for a week before using.

Note. This water may very properly be used as a wash to give an agreeable bloom to pale faces.

CVI. *The receipt of the fine Venetian lake.*

1. Take one pound of good pearl ashes. Put it in a large copper; then, pour over it six gallons of spring water. Let the pearl ashes soak thus twenty-four hours, after which, set the copper on the fire, and boil it for one quarter

quarter of an hour. Then filter through a cloth jelly-bag, and receive the filtration in a stone pan.

2. If not quite clear, filter it till it is ; changing the pan only underneath, pour what ran thick in the bag again. When all is new filtered and clear, put it in the copper again, which must have been previously washed, and set it on the fire to boil. When it boils, throw in two pounds of fine scarlet flocks, which boil to whiteness. Then filter again this lye tinged with scarlet colour, in the beforementioned jelly-bag, and press well the flocks, that there may not remain any colour in them.

Observe that your bag may serve both for the lake and tincture, without being at the trouble of cleansing it, you must not filter through it the second lye in which the scarlet is. For should you pour this lye from the copper, directly into it, the scarlet flocks would undoubtedly run with the lye, which would give you an infinite deal of trouble to get out of the bag, after the filtering of the tincture. And the least bit of it would entirely spoil the lake. Therefore, to avoid all these inconveniences, strain your second lye either through a cloth, or through another bag by itself.

3. While the tincture is filtering, get the copper well cleaned, and wiped dry. Put the filtered tincture in it. Dissolve, over the fire, or glazed earthen pan, half-a-pound of Roman alum in one quart of spring water. Then strain it quickly, and while warm, pour it in your tincture, keeping stirring all the while, and afterwards, till all the froth has quite subsided. Boil next altogether, for the space of half a quarter of an hour. Then throw it in the same bag that filtered your first lye, and receive the filtration into a clean stone pan.

4. Besides this : boil again, in another quart of spring water, half a pound of *Fernamburg Brasil* wood, cut and bruised in an iron mortar. Strain it through a cloth, and pour it, along with the above dissolution of Roman alum, in the jelly-bag, and stir it to run altogether.

5. After all is run out of the bag, throw in again half a pint of quite clear and pure spring-water.

6. When nothing runs any more out of the bag, the lake is left in it. Take it out with a box spoon, and spread

spread it on plaster flat stones, three fingers thick, and about half a foot square, covered with white cloth of the same size. For should there be no cloth on the plaster, the lake would stick to it.

Note. It often happens for the first water which runs out of the bag to be muddy, and to carry some lake along with it. But you must continue filtering till it comes bright and clear. Then, taking off the pan from underneath, and substituting another, put that muddy liquor into the bag again.—Should the filtration by chance continue to run red, as it sometimes happens, you must still keep filtering the liquor through the bag, till it is clarified.

CVII. *Directions for colouring prints.*

1. All the colours which are used for colouring prints are grinded with gum water; the calcined green only excepted, which grinds with vinegar.

2. The chief of these colours are, fine azure, vermillion, Venetian lake, fine verditure, white lead, calcined green, umber, Cologn earth, indigo, French berries juice, yellow ochre, yellow masticot, white masticot, brown ochre, bistre, or prepared soot, lamp-black, and brown red.

3. For complexions, make a mixture of white and vermillion, more or less, according as you want the colour. For the lips, it is a mixture of lake and vermillion, And the shades are made with white and vermillion, and a great deal of umber.

4. For fair hair, join a good deal of white with very little umber. If a carotty colour, take yellow ochre and brown red; the shade with bistre and lake mixed together. If light, only mix some black and white and umber together.

5. Clothes are made, if linen, with white lead and a little blue; if stuffs, with white lead alone, and the shades with a grey colour, made by means of a mixture of black and white lead together. If a white cloth, you must make a mixture of white and umber together, and shade it with a compound of umber and black. If a red cloth, use vermillion in the lighter parts of the folds; lake and

and vermillion for the clear shades; the lake alone, laid on the vermillion, will form the dark shades.

CVIII. Directions for the mixture of colours.

1. The pale yellow, for the lights, is made with white masticot. The *chiaro oscuro*, with the masticot and umber. The dark shade, with umber alone.
2. The orange colour is made with black lead for the lights, shade with the lake.
3. The lake is used very clear for the lights, in draperies; and thicker for the shades.
4. The purple is made with blue, white, and lake, for the lights; blue and lake only for the clear shades, and indigo and blue for the darker ones.
5. The pale blue is used for the lights, and for the clear shades a little thicker; but for the darker shades, mix the indigo and blue together.
6. The gold-like yellow is made with yellow masticot for the lights; and the clear shades with a mixture of black lead and masticot; the darker shade with lake, yellow ochre, and very little black lead; and the darker of all, with Cologn earth and lake.
7. The green is of two sorts. The first made with masticot and blue, or blue and white; and for the shades, make the blue predominate in the mixture. The other is made with calcined green; and French berries juice, mixed and calcined green; and you may form their shades by addition of indigo.
8. For trees you mix green and umber together.
9. The grounds are made in the same way; wherever there is any green, take calcined green, with French berries juice.
10. For the distances, mix green and blue together; and mountains are always made with blue.
11. The skies are likewise made with blue, but you must add a little yellow to them, when it comes near the mountains; and to make the transition between that and the blue, mix a little lake and blue together to soften it.
12. Clouds are made with purple; if they be obscure, you must mix lake and indigo together.

13. Stones are made with white and yellow mixed together: and their shades with black.

CIX. *Directions for painting fresco.*

Lay on the intended wall a coat of rifted silver sand, mixed with old slack'd lime, pulverised and sifted also—This coat is not to be laid on the wall, but in proportion as you paint: therefore prepare no more at a time than you are sure to paint over in one day, while fresh and moist.—The body of the wall on which you lay this coat must previously be pargetted with plaster, or mortar made with sand and lime. And if the paintings are to be exposed to the injuries of the weather, the mason's work must be made of bricks or free-stones very dry.

2. Before you begin to paint, you must prepare your designs in their full intended size on paper, and chalk them one after another on the wall, in proportion as you work; and no longer than half an hour after the coat of prepared river sand has been laid on, and well polished with a trowel.

3. In these sorts of paintings all the compounded and artificial made colours, as well as most of the mineral ones, are rejected. They use hardly any other but earths, which may preserve their hue, and defend it from being burnt by the lime. And that the work may for ever preserve its beauty, you must observe to employ them quickly, while the coat underneath is still moist; and never, as some do, touch them over after they are once dry, with colours diluted in yolks of eggs, glue, or gum, because these colours always b'acken, and never keep that vivacity and brilliancy those have which have been laid at first when the ground was moist. In the case of paintings exposed in the air, this sort of *touching up* is never good, and too often scales off in a short time.

CX. *Directions for the choice, use, and composition of the colours employed for the above purpose.*

The colours made use of for the above purpose, are such as follow.

F. The

1. The white is made with a lime which has been slackened for a great while, and white marble in subtile powder, mixed in about equal quantities. Sometimes no more than a quarter part of marble dust is required; which depends entirely on the quality of the lime, and cannot be known, but when you come to use it; for if there be too much marble, the white will turn black.

2. Ochre, or brown red, is a natural earth.

3. Yellow ochre is also a natural earth, which becomes red if you burn it.

4. The obscure yellow, or yellow ochre, which is also a natural earth, and slimy, is to be got by the streams of iron mines. It receives a fine colour from calcination.

5. Naples yellow, is a sort of filth which gathers round the mines of brimstone; and though it be used in *fresco* paintings, its colour nevertheless, is not so good as that which is made of earth, or yellow ochre and white mixed together.

6. The purple red is a natural earth, the product of England, and is used instead of lake.

7. The *terverte*, from Verona in Lombardy, is a natural earth, which is very hard and dark. There is also another sort of *terverte*.

8. The ultramarine, or *lapis lazuli*, is a hard stone, and of a very difficult preparation. This colour, of the manner of preparing which we shall give (§ ix. Art. cxxviii.), a just and precise account, subsists, and keeps itself fine much longer than any other colour. It is not to be ground, but diluted only on the pallet with oil. As it is very dear, you may spare using it in *fresco* paintings, and supply it by smalt, which answers the same purpose, particularly in skies.

9. Smalt is a blue colour, which has very little substance. It is used in great landscapes, and stands very well the open air.

10. Umber is an obscure earth. It requires to be calcined in an iron box, if you want to make it finer, browner, and of a better look.

11. Cologn earth is a sort of rusty black, which is apt to discharge, and turn red.

12. The

12. The earthen black, is a black which comes from Germany—There is also another sort of German black, which is a natural earth, and makes a bluish black, like that of charcoal. This sort of black is that which is used for making printers ink.—There is another still, which is made with burnt wine-lye.

Such are all the colours which are preferably to be used in *fresco*-painting. Grind and dilute them with water.—Before beginning to work, prepare your principal colours, and put each by themselves, in small gallipots. But it is necessary to know, that except the purple-red, the brown-red, the yellow ochre, and all the blacks, (those particularly which have passed through the fire) turn paler as the *fresco* dries.

CXI. Directions for painting in oil on a wall.

Method 1.

You must, when the wall is perfectly dry, give it two or three coats of boiling oil, or more, if necessary, so that the face of the wall may remain greasy, and can soak in no more; then lay another coat of siccative colours, which is done as follows. Grind some common whitening, or chalk, red ochre, and other sorts of earth, pretty stiff, and lay a coat of it on the wall. When this is very dry, then draw and paint on it whatever you will, observing to mix a little varnish among your colours, that you may not be obliged to varnish them afterwards.

CXII. Method 2.

In order it may sooner dry, and that the dampness should not occasion the colour to scale, as it sometimes happens, on account of the oil which resists it, make a cement with lime and marble dust, or tiles; this lay on the wall with a trowel, smoothen it, and then give it a coat of lintseed oil with a large brush.—In the next place, prepare a composition of Greek pitch, mastich, and coarse varnish, which boil altogether in a pipkin, and lay afterwards, first with a brush, then smoothen with a hot trowel, in order to spread it more equally.—

When

When this is done, lay on the coat of fiscative colours abovementioned, then draw their design and paint.

CXIII. Method 3.

Others again make a cement, or mortar, with lime, brick-dust, and sand. And when this is dry, make another with lime, sifted brick dust, and smith's embers, or iron scum, all in equal quantities. Beat and incorporate together, with whites of eggs and lintseed oil; and it will make so strong a cement as cannot be equalled by any thing else. Its nature is such, that while you are laying it on, you must not stop and leave it till you have finished, otherwise it will assuredly crack in every one of those places where you resumed your work. Therefore go on without interruption, till the whole wall is entirely covered with it, and totally polished—And when dry, lay the abovementioned coat of fiscative colours, and proceed according to the other directions.

CXIV. Directions for painting in oil on wood.

Lay first one coat of size on the wood; then another of whitening diluted with size; then another again of boiling oil, as mentioned in the above Art. cxi. When this last is thoroughly dry, you draw your design, and paint as usual.

CXV. Directions for painting in oil on canvas.

1. Chuse a fine and smooth tick or cloth, which nail on a frame. Pass over it first a coat of size, and when dry, rub it over with a pounce stone to eat off all the knobs and knots. The size which you put first on the cloth is intended to lay down all the threads, and fill up all the small holes, that the colour may not pass through.

2. When the cloth is dry, lay on a coat of simple colour, which may not destroy the others; for example, brown-red, which is a natural earth, full of substance, and lasting. You may mix it, if you like, with a little white lead, it will dry the sooner.—To grind this colour,

lour, they use nut, or lintseed oil; and in order to lay it as thin as it is possible, they use a large knife made on purpose.

3. When this colour is dry, you are to rub it again with the pounce stone, to render it smoother. Then lay another coat of white lead and charcoal black, to render the ground greyish. In this as well as in the preceding coats, you must take care to put as little colour as you possibly can, to prevent the cloth from cracking, and for the better preservation of the colours which are to be laid afterwards in painting. For it is proper to observe, that could there be no ground at all laid on the canvass of a picture, previous to the painting of it, and should one paint directly on the bare cloth, without any other preparation at all, the colours would appear much more to their advantage, and preserve their brightness much longer. A proof of this assertion may be found in the practice of *Paul Veronese*, and *Titian*, who used to impregnate their canvass with water colours only, and paint afterwards in oil over that ground. This custom of theirs has not a little contributed to render their pieces more lively and bright, because the ground in water colour draws and soaks the oil off the colours, which must render them much finer, since the greatest cause of their dulness arises from nothing but the oil with which they are diluted.

4. They therefore, who wish to see their works keep bright and lively, use as little oil as possible, and keep their colours more stiff, mixing a little oil of spike amongst them, which indeed vaporises very soon, but assists in rendering them more fluid and tractable in working.

5. Another cause of the colours not keeping a long while their beauty, is when they are too much tormented on the pallet, as it often happens that painters confuse them in working. Whenever this is the case, they must needs be hurt, as there are many which adulterate, and otherwise corrupt the others, and spoil the vivacity of their teint. Therefore, we cannot recommend too much to be cautious and clean in employing them, taking care

to

to lay them as distinct and separate as possible, each by themselves, on the pallet, without mixing them too much with the brush or pencil. Never mingle together those colours which are enemies to each other, as all the blacks are, particularly the lamp-black; but as much as possible, try to use them separately by themselves. Nay, when there is an occasion of giving more strength to some parts of a picture, stay till it is dry before you touch it up again, if those colours are obnoxious to the others with which you are to do it. There he shows his judgment in painting, who is not precipitate in laying his colours on his pictures, but lays them thick enough, and covers at several times the carnations, which in terms of art is called *empater*.

6. As to what concerns the first laying of grounds on canvass, in water colours, it is a method not commonly practised, because they may scale, and cannot be rolled without some difficulty. For this reason, the custom prevails of grounding the canvass with oil colours. But when the canvass is good and very fine, the less colour you can lay on for that purpose, the better. Take care only those colours and oils are good.—The lead which some painters use to help their colours to dry the sooner, soon destroys their brightness and beauty.

CXVI. *Which colours are used for the above purpose.*

1. Though all the different sorts of colours which are used in painting in oil are not fit for that called *fresco*, yet it is true, however, that (except lime and marble dust, which indeed cannot strictly be called colours) every one of those used in *fresco* are good in oil.

2. White lead; is made with lead which you bury. Several years after, this lead turns into some sorts of flakes, which are of a very fine white.—Though this white exists in painting, and is in positive use, it has always, however, a very bad quality, which the oil corrects a little, when you grind it on the stone.

3. Ceruse, or flake white; is a sort of rust gathered from lead, but of a coarser nature than the other.

4. Massicot; there are two sorts of this colour. The one is yellow, and the other is white. It is made with calcined lead.

5. Orpine, otherwise auripigment. Is used calcined and non-calcined.—To calcine it, they put it in an iron box, or in a pot well stopped. But few either calcine it, or even use it at all, as the fumes are mortal, and it is very dangerous to use it.

6. Black lead comes from lead mines. They make very little use of it, because it is a bad colour of itself, besides that, it is a great enemy to the others.

7. Cinnabar, or vermillion, is drawn from the mines where they gather quicksilver. As it is a mineral, it is the reason why it does not resist the impression of the air, nor the injuries of the weather.

8. Lake. This colour, which is an artificial made one, is composed with cochineal, or with scarlet flocks; or again, Brasil wood, and some other sorts of woods. There are several sorts of lake made. It does not stand the weather.

9. Blue verditure and green verditure is very seldom used in any other works but landscapes.

10. Indigo. This colour is generally used for making skies, or draperies; when properly used, it keeps its beauty a great while. You must not mix it with too great a quantity of oil, but lay it a little thick and dark, because it discharges very much. They use it with great success, diluted with gum water. It is a good colour for the composition of greens.

11. Brown-pink, otherwise called *fil-de-grain*. This colour is drawn from what is called French berries, which they soak and boil, then mix the result with vine-wood ashes, or calcined white chalk, to give it a proper consistence. When this is done, it must be strained through a very fine cloth.

12. Lamp-black. This is a bad colour, but handy to paint black draperies.

13. Ivory black. This black is made indifferently with common bones, as well as ivory burnt. *Appelles*
discovered

discovered this sort of black, if we believe *Pliny*, Book xxxv. Chap. v.

14. Verdigrease is the most pernicious of all the colours, and capable to ruin a whole picture, if there were never so little in the colour with which the canvass is first impregnated. It is however of a very agreeable look. They sometimes calcine it to prevent its malignant effect; but it is as dangerous to use it that way as orpine; and it is an undoubted truth that, however well prepared it may be, it must be employed by itself, for it would spoil all the colours with which it may be mixed. It dries very much, and for that purpose they mix a little of it with the blacks, which can never dry without some assistance.

N. B. You must be very careful never to use, for other colours, the pencils with which you shall have laid any verdigrease.

15. There are again some other sorts of compound colours, which are never used but in oil.

CXVII. *Which oils are used in painting.*

1. The best oils which are used in painting are those of nut and lintseed. To render the colours more fluid, and spread more easily under the pencil, they use also oil of spike. This oil absorbs itself in the canvass, and leaves the colours without any gloss. It is made with the flowers of a plant called spikenard or lavender spike.

2. There is another oil drawn from Melezian-rosin, firs, &c. wherefore it is called oil of turpentine. This oil is very good for touching up pictures; but it is chiefly good for mixing with ultramarine, and the different sorts of smalts, because it serves to make them spread with more facility, and evaporates almost immediately. When you make use of this oil, the less there is of any other oil in the colour the better, as they all serve only to make it turn yellow.

3. There are other oils again which are denominated siccatives oils, because they serve to dry up the others the sooner. These are many in number and species. One sort is nothing but the oil of nut, boiled with gold litharge

litharge and a whole onion peeled, which is taken off after boiling; this onion serving only to exsiccate the greasy parts of the oil, and to clarify it. Another sort is made with azure in powder, or smalt, boiled in oil of nut. When the whole has boiled, you must let it settle, and then skim off the top. It is fittest for diluting the white, and such of the other colours as you want to preserve purest and neatest.

CXVIII. To take off instantly a copy from a print, or a picture.

Make a water of soap and alum, with which wet a cloth or a paper; lay either on a print or picture, and pass it once under the rolling-press; then going round the other side to take it up, you will have a very fine copy of whatever you shall have laid it upon.

CXIX. Directions for making the Spanish carnation.

Take bastard saffron; wash, dry, and grind it well. While you grind it, put in four ounces of pearl ashes to every one pound of saffron. Incorporate them well, both together, and throw it into a double cloth jelly-bag. Then set half a pint of Spanish lemon juice on the fire, and when just lukewarm, pour it on the saffron in the bag, and lay under it what you want to dye.—The stuff which is to be dyed ought previously to have been boiled in alum-water, then rinsed and wiped between two cloths, as a preparatory process to make it take the dye better.

CXX. To make the Spanish ladies rouge.

Vermilion, carefully laid on a sheet of paper, from which, by means of wetting the tip of your finger with your spittle, then take it off, at will, and rub your cheeks, lips, &c. The method of making it is as follows.

1. Take good scarlet flocks and spirit of wine, or in their stead, lemon juice. Boil the whole in an earthen pot, well glazed and well stopped, till the spirit of wine, or lemon juice, has charged itself with all the colour of the scarlet flocks. Strain this dye through a cloth, and

wring it hard to express well all the colour out. Boil it afterwards with a little arabic water, till the colour becomes very deep.

2. On half a pound of scarlet flocks you must put four ounces of spirit of wine, and a sufficient quantity of water, to soak well the flocks. Then in the colour you extract from it, put the bulk of a filbert of gum arabic, and boil the whole in a silver poringer. When this is ready, as we said before; proceed as follows.

3. Steep some cotton in the colour, and wet some sheets of paper with it; then let them dry in the shade. Repeat this wetting, drying of the same sheets over again, many times, till you find they are charged with *rouge* to your satisfaction.

CXXI. *A fine lake, make with shell-lac.*

1. Boil and skim well, sixteen pounds of chamber lye; then put in one pound of fine shell-lac, with five ounces of roch alum, in powder. Boil altogether, till you see the chamber lye is well charged with the colour, which you may easily know by steeping a bit of white rag in it; then take it out again to see whether or not the colour please you; and if it do not, let it boil longer, repeating the same trial, till you are perfectly satisfied.

2. Throw now the liquor in a flannel bag; and without suffering what runs into the pan under to settle, repour it into the bag so many times, till the liquor runs at last quite clear, and not tinged. Then with a wooden spatula, take off the lake, which is in form of curd; form it into small cakes, or balls, and dry them in a shade on new tiles; then keep them for use.

CXXII. *Directions to make cinnabar, or vermilion.*

1. Put mercury (or quicksilver) in a glazed dish. Set it on a sand-bath, and let it be well surrounded with the sand every way. Pour some melted brimstone over it; and with an iron spatula, keep constantly stirring, till the whole is converted into a black powder.

2. With this powder, fill the quarter part of a retort with a short and wide neck. Place it first on a fire of cinders.

cinders. Increase the fire by degrees, and continue it for ten hours; after which make a blasting one for twelve hours.

3. Observations.—By the first fire, there will arise a black fume.—By the second, a yellow:—And by the last a red; which signifies the perfect accomplishment of the cinnabar.—As soon as this is the case, let the vessel cool, and you will find in the receiver, and in the neck of the retort, a very fine cinnabar.

N. B. Many, instead of a glass retort, use earthen, or stone, which all equally bear the fire. Make a slow fire, for about half an hour, then increase it till the red fumes arise. Both methods answer the same purpose.

CXXIII. *Another method of making cinnabar.*

1. Melt brimstone in a pipkin over a slow fire, then take it out, and with one hand squeeze a knot of mercury between your fingers through a cloth into the melted sulphur; and with the other, stir well till the lump is become quite cold and black.

2. Put this into a subtile powder, with which having filled the fourth part of a very long retort, lute it well, and very exactly, with a good lute. Place it next without a receiver, for two or three hours, on a very mild fire; then introduce into the retort a long funnel which will reach to the bottom of the retort, through that funnel pass a long spatula, which touching also the bottom of the retort, should come out of the funnel five or six inches. In the middle of the spatula let there be a hung of lute round it, well dried, which will stop so well the retort as to prevent it from breathing any air. When all this is done, push on the fire to a pretty smart degree, and keep it for five hours.

3. At the end of this term, draw out the spatula, and introduce, through the same way that it came out, two spoonfuls, or thereabouts, of your prepared powder of brimstone and quicksilver, with which you intend to make cinnabar, which for that purpose, have kept warm in a vessel by the corner of the fire, that it may not cool the retort in going in, and thereby retard the operation.

4. Continue so to do, adding every hour new matter, by means of the drawing out the spatula to introduce the new powder, and replacing it quickly, till you have increased your lump of cinnabar to the quantity of one hundred weight.—The spatula's use in the neck of the retort is to prevent its filling itself up by the sublimation of the matter, which would occasion two evils, that of breaking of the retort, and of preventing the introduction of new powder to increase the lump of cinnabar. So that at the same time it keeps a free passage into the retort, it nevertheless stops it too, by means of the ball of lute which is round it—But in the last place, in order there should remain no vacancy in the middle of the cinnabar-lump, take off the spatula for the last time, and inject fresh powder; then, without reintroducing the spatula, stop the retort with a lump of lute only—Thus the longer you keep the fire up, the harder and redder the lump of cinnabar becomes.

5. Observations.—This cinnabar is the very same which empyrics use in fumigation, along with aloes wood, myrrh and other aromatics, to excite the mouth, or belly, flux, which they reiterate two or three times, or till that flux is abundant enough to procure the cure of the venereal disorder—It is the same also which painters make use of; and which enters into the composition of sealing wax.

Some alchymists maintain, they can with the natural or fictitious cinnabar we have just mentioned, resolve irreducibly either gold or silver; because they are of opinion, that these metals have sprung from it in the entrails of the earth. But it is proper to tell them here, that they would no perhaps commit so gross an error, if they attempted this process with the cinnabar, which the philosopher endeavours to draw from quick gold and silver, and which are known to him alone. To which reflection I shall add, that he to whom quick gold and silver are known can do with them also every thing as with the metals; but as the old saying is, *Non licet omnibus adire Chorintam.*

CXXIV. *An azure as fine as, and which looks similar to, ultramarine.*

Grind well together in powder three ounces of ammoniac salt, and six of verdigrease. Then wet it in continuing to grind it with oil of tartar, till you have made it pretty fluid. Put this into a glass matrass, and bury it five days in hot dung. At the end of that term you will find your composition turned into a fine azure.

CXXV. *The same, as practised in Germany.*

1. Distil in an alembic, one pound of vitriol, half a pound of nitre, and three ounces of cinnabar. In this water put tinsel or copper; they will dissolve. When the dissolution shall be perfected, add a sufficient quantity of calcined pewter to render your liquid quite milk white. Let the whole rest for three days, and then you will have a middling azure.

2. The liquor which stills from the vitriol, cinnabar and nitre, has the power to dissolve any sort of metal whatever.—It has again this additional virtue, that if you rub the forehead of a horse with it, the hair will instantly turn, and remain white at that place.

CXXVI. *Another very fine azure.*

Dissolve in one pound of the strongest double distilled wine vinegar, two ounces of ammoniac salt in powder, one of copper filings, and one pound of the whitest egg shell calx. Put this composition into a copper vessel well stopped, that nothing can possibly exhale from it. Place this for one month in hot horse dung, and at the end of that term you will find a very fine azure.

CXXVII. *Another.*

Take vitriol calcined to redness, one part *sulphur vivum*, two; and quicksilver, three. Mix well all into one powder, which put into a glass retort, and bury it over in hot horse dung for forty days; after which term the composition will be turned into a very fine azure.

§ IX. Preparation of the lapis lazuli to make ultramarine.

CXXVIII. 1st. The general manipulation of the whole process: each single part of which shall be treated of in particular afterwards.

1. Take one pound, or whatever quantity you please, of *lapis lazuli*. Let your stones be well chosen, and of that sort which are streaky with gold. Try their quality whether good or bad, which is done thus. Break one bit of it, set it on red-hot coals, and blow as hard as you can for an hour, then take it off and let it cool. If in touching it, it drop like mold or dust, it is a sign it is not worth any thing; but if it remains hard and preserves its colour, it is good. When you have thus made yourself sure of the quality of the stone, break it all in small knobs, put them in a crucible on a melting fire, which by strength of bellows you push on for an hour and a quarter. Then throw them into the strongest double distilled wine vinegar. When they are thus extinguished, take them out to dry, and prepare the following water.

2. Boil a little raw white honey with two pints of water in a glazed pipkin. Skim it so long as there comes any scum on it; then take it off to cool; and, when cold, dissolve in it the bigness of a nut of the best dragon's blood reduced into a subtile powder. Run this dissolution through a white cloth into a glazed earthen pot. Observe to make your water (with that dragon's blood) neither too red, nor too clear, but to keep a just medium between both, that the azure may take a finer hue.—With this liquor grind, for the space of an hour and a half, the above-mentioned *lapis lazuli*, then gather it into a large glazed vessel, let it dry in the shade, but guard off the sun, otherwise it will undoubtedly lose its colour. When it is perfectly dry, grind it a-new into a very fine powder, then pack and keep it tied very closely in fine white linen. Then proceed to the following paste.

3. Take two ounces of the best white rosin, an equal quantity of Greek pitch, and the same quantity again of mastich,

mastic, linseed oil, turpentine, and virgin wax. Powder what is powderable; and cut small what is not. Put all into a new glazed pipkin, and boil it to perfection; which you know by letting a drop fall into cold water and taking it out with your fingers. For if it do not stick to your fingers, it is done to perfection, and if it do, it is not.—When, therefore, it is done to perfection, run it quite hot through a sheer cloth into a pan of cold water, wherein leave it till perfectly hard: then take it out and let it dry. When you want to incorporate it with the powder, proceed as follows.

4. Cut this paste into small bits, and put it to melt over the fire in a well tinned saucepan. When the contents come to make a noise, throw in two ounces of oil of bitter almonds, and let it boil for about ten minutes. In the mean while have your *lapis lazuli* powder ready in a vessel, then pour over it gently, and little at a time, what is boiling in the pipkin, observing to stir carefully while you pour, in order to incorporate well this liquid with the powder, which being done let the whole cool. Then, having rubbed your hands with oil of olive, take this composition and work it well in order to incorporate all perfectly: and, after having given it the form of a loaf, put it in a glazed vessel to keep it for use.

5. When you want to draw the azure from it (which must not be less than twelve days after this last operation; and it has laid in this glazed vessel) begin first by making a strong lye with vine wood ashes, which you strain through a flannel bag, to get it very clear. Then, putting it in a copper boiler, on the fire, till it is so hot as not to be able to keep the hand in without scalding, you pour some of it on what quantity of the above paste you please, to extract the azure from, and stir it gently till it begins to come out. When, by thus stirring your paste in this lye this last is become well charged with the colour, decant it out with another glazed vessel, of which sorts of vessels, you must have a good provision ready. Then pour again some more warm lye on your paste, and work well glazed vessels. Pour new warm lye again on your paste,

paste, and proceed as before, continuing so to do till the paste gives no more taint to the lye.

6. Observe, that when the lapis is good, you lose but four ounces of it out of one pound, and that you extract twelve ounces of azure in the following proportion. Five ounces of very fine ultramarine, by the first washes; four middling, out of the second washes; and three base ones, by the last washes. Each of these three different qualities must be kept separately, and washed in several clear lyes, by changing them from vessel to vessel several times, with new lye each time. And when they seem to you very bright, put them a-drying in a shade, but not in the sun, in a room perfectly free from dust.

7. When it has been thus perfectly dried, take a glass of brandy, in which you have put a-soaking a little Brasil wood, and asperge the ultramarine with that tinged brandy, stir it, and let it dry; renew the aspersion for two or three days, till the azure participates a little of this taint. And, when it is well dried, for the last time, you will find it to be of a most beautiful hue. Then put it in small leather bags, and keep them well tied.

CXXIX. 2d. *Directions to be observed in the process of preparing the strong cement, in which the lapis lazuli is to be incorporated, to draw afterwards the azure from it.*

1. Take first, clear and neat Venetian turpentine, four ounces; fine white rosin, six; fine Greek pitch, as much; clear and pure mastich, three; fine shining white wax, an equal quantity; purified lintseed oil, one and a half. Then have a well glazed pipkin, quite new; put in it first the turpentine, and set it on a small and mild charcoal fire. Stir it with a wooden spatula, like that of apothecaries, till it is well liquified; introduce, next, the rosin to it, by little and little at a time, and incorporate it well; when this is done, add the Greek pitch to it, in the same manner, then the mastich in powder at three or four times, then the wax cut very small, also by degrees, and stir well till the whole is perfectly incorporated together. Above all, take care to do this with a slow fire, oil,

oil, and set the pot on the fire, and let the composition simmer till the cement is quite done, which you know by the following experiment.

2. Turn the spatula all round the pot in the composition, then raising it out, let a drop or two fall into a pan of cold water. If the drop spread on the water, the composition is not done, therefore you must let it simmer longer on the fire. If on the second trial the drop keep in one lump, the matter is done.

3. When the cement has acquired a tolerable degree of coldness in the water, take it out in a lump; and, with your hands imbibed with lintseed oil, prepared and purified, as hereafter directed, for fear it should stick to them, work it so well, that there shall remain no more water about it. When this is performed, the cement is perfectly completed; and, to preserve it, keep it perpetually in cold water. Therefore, in summer, you must change that water every day, and with such precautions, you may preserve it eight or ten years always good for strong cement.

CXXX. *Another cement, of a softer nature.*

1. Take fine Venice turpentine, four ounces; fine white rosin, six; Greek pitch, as much; fine wax, one; and lintseed oil, three parts of an ounce. Prepare this cement after the same way as the other; and observe carefully in the doing of it the same order and circumstances.

2. Observe, however, that this sort of cement is sooner done than the first, and that it will sooner return you the azure than the first, which is harder, will do. But neglect not, if you intend to work the *lapis lazuli* with both these cements, you must begin with the soft first. And yet you are not to be kept ignorant, that if your *lapis lazuli* be not of the best sort (which is the gold streaked sort) you must guard well from giving it the two cements. In the art of preparing and giving the cement or cements, consists entirely that of making the ultramarine azure; in that point lies all your gain or your loss. Therefore take great care to do it well.

CXXXI. Directions to prepare, and purify the linseed oil, for the azure.

1. Take whatever quantity you will of fine linseed oil, of a fine saffron or gold colour. Put it in a glass, or bullock's horn, perforated at the small end. Pour over this oil some cold water, and stir it well with a stick, to mix it well, then let it settle. When the oil and the water are divided, open the little hole which is at the bottom of the horn, and let the water out. Put some fresh water, and repeating the same process seven or eight times, till the water runs off as clear as you first put it in.

2. Thus your oil shall be perfectly purified; and in that state you may keep it in a well stopped glass bottle for use.

3. The oil of bitter almonds may absolutely supply the want of this; but besides its being dearer, it is not near so good for the purpose.

Note. That whenever we shall speak of oil, we always mean linseed oil thus prepared and purified.

CXXXII. The lye to wash the ultramarine with.

1. Take eight or ten handfuls of pearl ashes, made with vine wood ashes. Put this into a box perforated at the bottom, and large enough to hold a couple of pailfuls of water. Place this basket, and set it so that the water cannot run out of it without carrying the ashes along with it. Stop the hole on the outside, before putting the ashes into it, and press these down very hard, then pour, by degrees, a pailful of warm water over these ashes. When these are settled again, unstop the hole, and put a bung, made of an old list of white cloth, through which you will make it run drop by drop into a pan. Repeat this distillation again, by putting this same lye into another perforated box, without any ashes, and stop it with another bung of the same kind as the first, so that you may get your lye fine and clear; and put it to keep in a well glazed vessel, carefully covered, for fear of the dust.

2. Now pour another similar quantity of warm water on the same ashes as before; proceed exactly with this secqnd

second water as with the first, and keep these two sorts of water for use.

3. Repeat again the same operation, by pouring a third pailful of water on the same ashes; and proceeding in every respect as with the two former, you will be possessed of three sorts of lye, of three different degrees of strength.

4. These various sorts of lyes serve to wash the cement or paste, in order to draw the azure out, after the method hereafter prescribed. And, when you want to proceed to work, take of these three different sorts of lye, and mix them so as to give them the due degree of strength according as you think requisite.

CXXXIII. *Another sort of lye for the same purpose.*

There is another sort of lye which can be made to cleanse the cement of its unctuousness and grease, and which they prepare in the following manner.

1. Take whatever quantity of calcined tartar you like. Boil it for the space of a quarter of an hour, in clear water. Then let it settle, and decant it into a glass bottle, stop it well, and keep it for use.

2. It is fit for taking the grease off the cement when too unctuous. Likewise to wash the ultramarine with, and thereby heighten its colour.

3. This lye has also another particular quality, which is that of curing the mange, the itch, and other cutaneous disorders, by washing with it. It purifies and whitens the skin prodigiously.

CXXXIV. *Directions for the choice of the vessels in which the most impure ultramarine is to be washed, in order to be mixed afterwards with the other azure.*

1. The vessel, if it be an earthen vessel, it should be well hardened in the baking, and finely glazed in the inside, or, if of brass or copper, it should be of a perfect polish all round, and at the bottom, in the inside.

2. It must be perforated by the side with three holes, to admit of three cocks, one toward the middle part, the other

other lower, and the third at two fingers breadth from the bottom.

3. Though the azure matter which is at the bottom of the vessel appear not to you to be such, let it rest eight or ten days, and you will be convinced of the contrary. When you plainly perceive somewhat of azure at the bottom of the water, decant it out as gently as possible; take out that azure, wash it with clean water, and you will find it as good as the rest.

CXXXV. *Observations for discerning the good or bad qualities of the lapis lazoli, from which you intend to compose ultramarine.*

1st Trial. Wet first the *lapis lazoli* with common water, and wrap it up in a piece of fine white cloth or serge. It will thereby become of a fine lustre, and purple colour, very agreeable to the sight.

2^d Trial. If you want to know whether or not it be fine, set it on blasting charcoals, and blow them continually for a good while. Then take it off from the fire. If, being cold, it has not lost much of its colour, it is fine; but if it has lost none of its colour, none can be finer. For the *lapis* which is of a superior degree of fineness, acquires, instead of losing colour, when put to this trial.

3^d Trial. For the third experiment, put the *lapis* a reddening on an iron plate over the fire; then extinguish it in the best double distilled white wine vinegar. If by this trial it acquire more colour, it is too fine; if it only keep its own without any alteration, it is good, and such as you can wish to have it. The *lapis*, which on that trial acquires more colour, may be worth between thirty and forty shillings an ounce. But that which keeps its own natural colour after trials, is really scarce. As to that which loses the colour, you can make but very middling and common ultramarine with it.

4th Trial. When you buy it ready reduced into powder, in order to know whether or not it be pure, and without any mixture. It is this.—Put some of this powder into a goldsmith's crucible; set it on a strong fire to make it red hot, then take off the crucible. If it be enamel,

met, you will find it melted, but if it be true pulverised *lapis*, it will remain still a powder. If there be only a mixture of enamel with the pulverised *lapis*, that enamel, in melting, will gather up all the *lapis* powder, and when cold you will find it in a little cake at the bottom of the crucible.—This deception is very common among colour-makers.

Remarks. The three different azures, which, by means of the cements above-mentioned, you will get from the *lapis*, will amount altogether to fifteen ounces for each pound of *lapis*: that is to say, ten ounces of superfine ultramarine, which will sell for twelve or thirteen ducats an ounce; three ounces of medium, which will sell for between three or four half crowns, and two ounces of the common base sort, which will sell for one half crown. This last is little regarded, and is called ashy; but however, it will pay you for the expence of the cement, therefore you will easily be able to judge of the clear profit you can make out of it.—If you employ that sort of *lapis* which loses all its colour with the trial of the fire and vinegar, you will neither get so fine ultramarine from it, nor so much in quantity, as you can from the other. And if, as will be mentioned hereafter, you attempt to refine it, it will lose a great deal of its weight.

CXXXVI. *The method of calcining and preparing the lapis lazuli, in order to grind it afterwards.*

1. Take that sort of *lapis lazuli* which is streaked with gold veins, and which has undergone the abovementioned trials. Break it in small bits no larger than a filbert. Wash them in warm water, then set them on the fire in a crucible till red hot. When thus reddened, take them out one by one, and extinguish them in double distilled white wine vinegar, which shall have been previously run through a hat three or four times. When thus extinguished, take them all out again from the vinegar, and calcine them anew, then extinguish them again as before. Repeat this operation six or seven times, that they may more easily submit to the pestle in the mortar, and not stick to it.

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2. As for the *lapis*, which loses its colour by the fire, you must dispense with the calcining of it, for as it would lose it more and more, you would at last lose both your trouble and your money.

3. Therefore, put either that which is calcined, or that which is not, in a bronze mortar, covered over, and pound it well. Sift it through the silk sieve, covered also with its lid, that the most subtile part of the powder should not evaporate, as it is the best.

CXXXVII. *Directions for making the liquor fit to grind the lapis with, in order to make the ultramarine.*

1. Take three half pints of rain water, after having run through a hat three or four times. Put into a new pipkin, and dilute as much raw honey in it as will render the water yellow; boil it till it ceases to give any scum, which take care to throw away as fast as it rises. When it is quite clear and fine, take it off the fire, bottle it for the following use.

2. Have fine dragon's blood, grind it on a porphyry stone with the above prepared honey water; put this also, when well grinded, into another bottle. Over it pour so much honey water, till it acquires a purple colour. Decant it, when settled, from the ground, and keep it by itself. Such is the sort of water which is to be used to grind the *lapis lazuli* with.

3. *Observation.*—Should the *lapis lazuli*, from which you intend to draw your ultramarine, shew some purple colour of a remarkable hue and beauty, you must encourage it by means of the abovementioned honey water, which manage in the following manner. As the degree of purple you are to aim at, ought not to be deep, but rather pale and drawing towards the flesh more than the red, if the colour which comes from the *lapis* should be too deep, you must diminish that of the honey water; and if that of the stone is too pale, then render that of the liquor deeper.—By these means you may make these three sorts of colours of what degree you like, by giving more or less of the liquor, and colouring this at your will, according as you see either of these proceedings requisite for your purpose.

Note. Chuse the dragon's blood in tears, such as the goldsmiths use, not that which is in powder.

CXXXVIII. *The method of grinding the lapis lazuli on porphyry, and the signs which attend it.*

1. When the *lapis* is well pounded into powder, and that powder has been sifted, as before directed, set it on porphyry-stone, and grind with the mullar, bathing it, as you grind it, with the honey water, by little and little at a time.—Keep your powder on the stone, in as small a compass as you can.

To grind thus, one pound of pulverised *lapis*, you must divide it into three parcels, and grind one of each, and no more, at a time; and it must take two hours grinding at least, to make money of it.—Take care to keep your stone wet with the above prepared honey water all about your paste, that this should not stick to the stone while you grind it. This wetting must take, in all, about one tumbler full of the liquor for the whole pound of *lapis* powder.—When you have grinded one part of that pound, take it out, and grind the second on the same spot on the stone, then the next, and so on, as long as you have any to grind; and be very sure that in grinding it, you use no other water than honey water.

2. To know whether or not it be sufficiently grinded, take a little on the tip of your finger, and mash it between your fore-teeth. If you do not feel it crack as the dry powder does, then it is sufficiently grinded.—Take care not to grind it too much, lest it should lose its colour, which happens sometimes.

3. To dry the *lapis*, after it is grinded, put it on a clean stone, and set it to dry in the shade, not in the sun, for it would spoil it.—When it looks as if it were dry, touch it with the finger, and if it rubs into powder, as mould or dirt would do, you may leave it longer. But if it resist the finger, and does not break, then it is time to take it off.

4. Then comes the washing of that ultramarine azure, which is performed as follows. Take a new china bowl, without any crack or rivetting whatever, and of the most

most perfect polish or glaze in the inside, put therein your dried lump of paste. Over it, pour the soft lye above described, and let it surpass the lump in the bowl by four fingers breadth. Then wash it well between both your hands, and dilute all entirely into that lye. When that is done, let it settle, and when the azure is entirely precipitated at the bottom, and the lye swims quite clear over it, decant it out gently by inclination, and set the azure a drying in the shade, without moving it from the bowl. When you find it pretty dry, take it out carefully, spread it on the porphyry stone, to finish drying. And when it is thoroughly dry, in that manner, give it the cement as follows.

CXXXIX. *The method of incorporating the grinded lapis lazuli, with either of the strong or soft cements.*

1. For one pound of the *lapis lazuli*, prepared as directed in the preceding article, take one of the strong cements described. Rub this over with your hands, as you take it out of the water, in which preserve it: then cut it in small bits, and put it a melting over warm ashes, in a glazed new pipkin. Take care that, in melting, it should not fry. When this happens, put a little lintseed oil, and it will immediately cease to fry.

2. When the cement is perfectly well dissolved, take that same spatula which before served you to make it with, rub it over with a little of the same oil, and stir well the melted cement with it. Then with the other hand, taking a pound of prepared *lapis lazuli*, let it run slowly into your cement, till the whole pound is put into the cement, which you must never cease to stir and mix, with the spatula, as long as you pour in the *lapis*. Continue still to stir after that, till you are well convinced that the *lapis* and the cement are both perfectly well mixed and amalgamated together.

3. When this is done, take immediately the pot, and pour the contents, quite boiling, into a vessel full of cold water, and with the spatula take out all that is about the sides of it, and clean it well. Then, when the said cement shall be cold enough to admit touching it with your hands,

hands, rub them all over with purified lintseed oil, and take it out of the water. If in pulling it, you see it is well tinged and coloured, it is a good omen. Work it well then between your hands, and with your fingers, for near two hours, pulling it the same time to the length and breadth, to see whether or not there are not some bubbles inclosing little parcels of powder not well divided and incorporated, and that you may spread them in the cement in working. Take notice, that the more the pate is thus wrought, the better it will be afterwards, as it will require less washing to get the azure out of it.

4. When it is thus wrought, form it into a lump like a loaf of bread, and put it into a china bowl with fresh cold water, where you shall let it soak for ten or fifteen days longer, because the longer it soaks, the finer and more perfect it becomes, and the more easy to get the azure out. But if it be not soaked at least twelve days, it will not do at all.

CXL. *Directions for extracting the azure out of the cement.*

1. Take the lump of cement, just mentioned, out of the cold water in which you left it to soak. Rub it softly over with your hands, and place it in a finely glazed china bowl, previously wet with the aforesaid lintseed oil.

2. Pour over it lukewarm common water, filtered thro' a hat before warming. Observe that this water, when poured on the cement, be rather cool than warm, and let there be about two fingers breadth in the bowl above the cement. Then let it soak there about one quarter of an hour.

3. Have two sticks made of box, or other fine and hard wood, susceptible of a fine polish. These sticks must be made round by a turner, of a foot long or thereabouts, a little thicker than one's thumb, being larger at one of the ends, and flattened in form of an almond.

4. With these sticks move and turn gently ~~the cement in~~ ^{the} bottom of the bowl, rub your hands with oil, and detach it carefully, turning and returning it gently

gently with your hands in the water, till at last it begins to be tinged with azure.—The first signs by which you know that the cement begins to render the ultramarine, are certain lines and streaks which appear in the water, not unlike the rays of the sun. And when this is the case, take notice that the water soon assumes a high hue of that colour, particularly at the first discharge of the cement, as it is always the best azure which comes first.

5. As soon therefore as you see your water sufficiently tinged, pour it out through a sieve into the vessel with three cocks, described before, supporting the cement on two sticks, for fear it should stick to the bottom of the bowl, when thus left dry on it. The reason why you are advised to run this water through a sieve, is to prevent any little bits of cement which have broken from the lump, and be loose in the water, from running along with it, and that so you might stop and rejoin it to the other.

6. When you have got this first water out of the cement, pour some more water, of the same degree of warmth, rather under lukewarm than above, and proceed as before with your sticks, moving and turning the cement, and so working it as to get new azure from it, which decant into another vessel separately from the first water.

7. Repeat again the same process, to draw the third azure, and decant again this into another vessel by itself.

Observe not to hurry, particularly at first, the softening of the cement in the water, by working it too hastily, if you force the azure too precipitately out of the cement, you will manifestly spoil all.

CXLI. *Observations on the colours of the azures, at their coming out of the cement, and the signs which attend them.*

1. The most manifest sign of the first azure coming out, is its apparent coarseness; a character which is owing to the veins of gold which appeared in the original stone, and which give the first ultramarine that sort of look.

2. The second azure will seem finer, but its colour will not be so high, nor so fine.

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3. The third will increase again in appearance of fineness, but diminish still more in hue, which will be of a much paler blue than any of the two others.—These observations are always on the supposition that the original stone was a good one, and had gone fairly through all the trials.

CXLII. The washing and purifying of the azures after they are got out of the cement.

When the different azures are all got out of the cement, let them settle and fall down, each at the bottom of their vessels. When their waters appear quite clear and free from them on the top, pour them out gently and carefully, by inclination; then supply them with soft lye, and wash those azures in it with your hands, and each of them distinctly in separate vessels by themselves. Then let them settle to the bottom, and decant out that lye, and repeat again and again the same process, till you are sure they are all well purged from the grease of the cement in which they were. Rinse them afterwards in three or four different clear waters, filtered through a hat, and they will be perfectly purified and clean.

CXLIII. Another way of purifying the same azures with yolks of eggs.

1. Take half-a-dozen of yolks of eggs, from hens fed upon corn, and not suffered to run among the grafts. Pierce the *pellicula* which covers those yolks with the point of a needle, and pour equally those yolks on the azure powder, as you would do oil on a salad.

2. Do the same on all your different azures, put separately in different dishes. Then incorporate well the azure and the yolks of eggs together with your hands. When done, wash it afterwards with the softest lye, so many times that it shall at last come out as clear as you first put it in; then rinse it three or four times in clear water, which has been filtered several times through a hat.

This method of washing the azures is an excellent one. It may be deemed a true secret to give them a fine lustre and brilliancy. Never forget to let each of your waters

be well sett'd before you change them, otherwise you will lose a great deal of your azures.

CXLIV. *Another secret for purifying azures.*

To give the most admirable lustre to azures.—Take a bullock's gall, and pour it on your separate azures, after they have been already washed and purified in waters, lyes, and yolks of eggs. Then rub and handle well those azures with your hands, each by themselves, and one after another distinctly, for fear of mixing some of the one with any of the others. Then wash them as above directed.

CXLV. *How to run the azures, after having been thus cleansed, washed and purified.*

1. The ultramarine azure, as well as all the others, ought to be run, for fear there should remain some grease, dirt, or bit of cement among them. Therefore, when they come to the last water, run them through a fine sieve, then through another more open, and through another again more so still. Each time let the waters settle, till you have them quite clear, or take them out by means of a sponge, as before directed, but do it with such care as not to have your azure get into the sponge with the water, which would be very detrimental to your interest.

2. When you have well cleared all the waters away, let those azures all dry in their own dishes or bowls, and in the shade, not in the sun, and guard well against dust and dirt in working them.

3. When the azures are perfectly dry, gather them each separately, and put them in small white bags made of animals skins with the smoothest side inwards. When the little bag is tied, rub it all manner of ways, to refine the azure in it; and the more you shall have done so, the finer colour the azure will acquire when you open it, and it comes to the air again.

CXLVI. *The*

CXLVI. *The method of making the green azure.*

1. With the Armenian stone, if we are to believe *Alexander Trollian*, who says, that it is enough to reduce that stone into powder on the marble or porphyry; then wash it several times in clean water, and dry it afterwards.—But it must certainly be far preferable to separate the colour from the constituent matter of the stone, and all its earthy particles, which must undoubtedly render it much finer and fitter for painting, as it is more purified of its heterogeneous parts. Therefore, the following process is most adviseable.

2. Reduce the stone into a subtile powder, then put it into brandy or distilled vinegar. Put this to digest on the hot ashes bath, or *balneo mariae*, till the liquor is perfectly charged with the colour of the stone. Decant it then gently into another vessel, and pour some more brandy or vinegar on its ground, if you have reason to think that there remains some colour still in the stone, throw away all the ground, as perfectly useless, and then evaporate, on warm ashes, the vinegar or brandy impregnated with the colour; or rather distil it, as by that means you will get your liquor pure again, and may use it another time for the same purpose, instead of washing it away.

3. By this process, which seems most rational, you will get the green colour quite pure at the bottom of the vessel. Wash and clean it pure with water, and after dying, keep it for use. This is a very fine colour in painting, and has this advantage, that it never loses its brightness.

CXLVII. *Another sort of green azure.*

1. Which is a natural production, found in copper-mines, and is as it were a dissolution, or subtilization, of copper, which flies and sticks on the stones it meets in its way. These sorts of vapours have generally some marks or signs of a mixture of silver, as it may be inferred from the colour or stain of those stones which partake of both these metals, for they are green by the copper, and mixed with azure by the silver. And according as either

of

of these metals is more or less predominant in the mine, one of these colours is likewise stronger in the same proportion. The method of collecting is as follows.

2. Grind the stone on which it is, and wash it several times over. It needs not be put in the cement after the method observed for the ultramarine azure, because that metallic efflorescence of the green azure, is very easily separated from the stony matter to which it is affixed. For which reason it needs only to be washed to render it as fine a colour as can possibly be ; and after it has been well washed, dry it in the shade, and keep it for use.

CXLVIII. *A very fine method for marbling paper.*

The paper must first be prepared, by wetting the paper with a sponge dipped in roch-alum water, then letting it dry.—When the sheets have been thus prepared, have a pan full of water, and with a large and long-handled painting-brush, take of one colour, and shake it in the water ; take of another and do the same, and so on till you have taken of all the colours you intend to have on your paper. Each of these colours fall to the bottom of the water ; but take with a similar brush as the first, a mixture of bullock's gall, and of dissolution of soap in water, then shake on the water, and all over its surface, and you will soon see all the colours rising up again and swimming on the top of the water each separately as you first put them. Then lay the sheet of paper on it, give it a turn on one side or the other, as you like, and take it up again ; wash and set it to dry, then burnish it, and it is done.

C H A P. VII.

SECRETS relative to the ART of GILDING.

I. *The method of gilding with size, or oil.*

THE gold leaves which are commonly used in gilding are of different sizes, as well as of various degrees of thickness.

To gild on iron and other metals, the strongest and the purest are preferable. That which is not so pure is commonly employed by carvers in wood, as it comes cheaper to them.

We are indebted to this discovery of the secret in painting in oil, for the means of gilding in such a manner as to resist the injuries of the weather.—An art the ancients were not acquainted with, and they could not obtain from their method of applying gold, since they used nothing else but whites of eggs for gilding marble, and such other bodies as do not admit of being committed to the fire. As for the wood, they made a composition which was used with size. But neither size nor whites of eggs can resist the water. Therefore they could not, with propriety, gild any other works than such as were sheltered from the intemperance of the weather, *viz.* their arches, their ceilings, which were all gilt in that manner. The composition they used for gilding on wood was made of a slimy earth, which held the place of the sized white we use now-a-days, and with which gilders made that first coat, called by artists *assiette*, or burnish-gold size.

II. To gild with size, or what is called in burnish gold.

1. Begin by preparing your size as follows.—Take about a pound of odd bits of parchment, or leather, such as is prepared for gloves or breeches. Put this a boiling in a pailful of water, till it is reduced to one half, and your size is done as it ought to be.

2. When you want to use it for wood which is to be gilt, it must be boiling hot, otherwise it would not penetrate sufficiently into the wood. If you find it too strong, you may weaken it, by adding water to it. Then with a brush, lay the size in smooth, if it be a plain work; but if a carved one, you must lay it in stumping with the brush; either of which ways is equally termed to *size*.

3. When the wood is thus prepared with size only, make another preparation, called *an infusion of white*, in the following manner. Take a quantity of size boiling hot, as much as you think will be sufficient for your work. Dilute a discretionary quantity of pulverised whitening in it, and let it infuse some time. When it seems well dissolved, strain it through a cloth to make it finer; then with a brush, as above, give seven or eight different coats of it in stumping on your work, and two more coats in smoothening, if it be on carved work; but if on a plain one, you must give a dozen of coats at least; for the white is the nourishment of gold, and serves to preserve it a great while.—Be careful not to give coat upon coat, unless the last be very dry; otherwise the work might scale. You must even have a great care that each coat should be laid on as perfectly equal as possible, both in the strength of the size, and thickness of the white, to avoid the same inconveniency.

4. When you have given the requisite number of coats, whether in stumping, or in smoothening, you must let the work dry thoroughly before you polish it. As soon therefore as it is perfectly dry, you must have a coarse rough cloth, quite new, and as closely weaved as possible, with little deal sticks, cut square, angular, or pecked, according as the nature and carving of the work require; and thrusting one of these sticks into the cloth, rub

and

and smoothen the white. Then taking a brush made of boar's bristles, which has been already used, because it is softer, dip it into some clean water, and wet the work in proportion as you go on in polishing, with your little sticks wrapped up in cloth. This precaution completes the smoothening of the work, by levelling the small bumps and imperceptible undulations you may have made either in giving the white, or in polishing it. For the smoother the work, the more easy to burnish the gold, after having been applied. Wet and brush it in proportion as you polish it, with a brush a little worn, spare not to purge your brush of all the filth it gathers about the point of its hair, by washing and squeezing it again as soon as you see them grow thick in the least with that dirt.

5. When the white is once more dried, rub it with shavegrafs, or rushes, in order to level still better all the grains and inequalities which may be on it. Do not however rub it too much with the shavegrafs, because you may thereby fall from one error into another, and make your white what is called greasy or smeary, which would prevent it afterwards from uniting with the burnish gold size, which is to precede the laying on of the gold.

6. Now, as it is difficult that after ten or a dozen of coats of white the carving should not be choaked up, they who are fond of finishing their work high'y, take an iron instrument, made on purpose, and curved by one end, (called by the French, a *fer-a retirer*); with this raffling-crook they go over all the turns, and open all the places which want it, to restore them to their former sharpnes. Or else, take what is called a *fermoir*, or *gouge*, and give to the ornaments the same form which the carver observed when he first cut them, turning agreeably the sides of leaves according to nature; then bretelling with another instrument, called the *veining crook*, (in French *fermoir à-nezrond*), all the ornaments, you thereby render neater, and more delicate than the carver had first made it. That you may cut the white more neat, observe only to wet it a little with a brush.

7. When works are not of great consequence, you may easily save yourself all that trouble; principally if the carving is pretty nearly finished, by giving two or three coats only of white very clear. But the white is the principal support of gold, this operation is never so perfect as when it has received ten or twelve coats of white, and been afterwards re-cut, carved, veined, and repaired over again, as I said before.

8. Then dilute some yellow ochre, and grind it with sized water, weaker by half than that which you used for the whitening. And having made it a little fluid and warm, lay one coat of it over all the work, principally in such deep places of the carving as you cannot come at to lay the gold leaf, that this colour may supply its want.

9. When the yellow is dry, lay over it (in all the raised places, but not in the bottom grounds) three different coats of another sort of composition, called in French, *assiette*, and here, *burnish-gold size*, prepared in the following manner.—Bol armenian, about the bigness of a nut, and grinded by itself; blood stone, or red chalk, the bulk of a horse bean, and black lead puiverised as big as a pea, grinded both together; and at last one drop or two of tallow, which grind afterwards with all the other drugs and water, taking them a little at a time, to grind and incorporate them the better.—Put this composition in a cup, and pour over it some of your aforesaid size, boiling hot, and strained through a cloth. Stir and mix all well, while you pour that size, that the whole may be well diluted. The brush you lay it on with ought to be soft, and the first coat lay pretty thin; but as for the two others, they must be so thick that the stuff should run with difficulty from the brush. Each coat must be well dried before giving the next. And when the last is also perfectly dry, take a stiffer brush, and dry-rub the work all over, to smoothen all the grains and little risings of the gold size, and thereby facilitate the burnishing.

10. The gilding is performed as follows. Have first a pipkin very clean, in which put some very clean and filtered water, and a few wetting pencils, which ought to be

be made in the form of those ermine tails which hang in the ermine skins.—Get next a cushion, which is to be made with a light and flat square board covered with calf leather, fixed all round with nails, and stuffed underneath with cotton. Let this cushion be also surrounded by the back part, and two thirds of each of the two sides, with a band of parchment of five or six inches high, to prevent the air from blowing off the gold leaf.

11. Put what quantity of gold leaves you think proper. With the gilding knife spread these leaves very smooth, in doing of which you will assist yourself very much if you breathe over them while you pass the knife under. Then cut it in as many parts and sizes as you want, or, if there be occasion for it whole, take it with your tip, and lay it.—A tip (in French, *palette*) is an instrument made with the point of a squirrel's tail placed upon a round stick flattened, and about half an inch wide by one end, with a slit, to set and spread the better the squirrel's tail.—This tip pass along your cheek, and with it take off the gold leaf, or what part of it you have divided, and thus lay it on the work. Previously, however, to this, you must have passed on the place one of your pencils immediately before the laying of the gold, otherwise the gold would be incessantly slitting and cracking.—As soon as the gold leaf is laid on the work, take your water pencil quite wet, and passing it above it on the work, let the water run from it under the leaf just applied; this will immediately make it spread and catch. But if it should pass over the gold leaf, it would immediately spot and spoil it; and as it is impossible to lay on gold, especially when wet, you would not be able to repair it unless you take the gold leaf entirely off, and put another in the stead. On the contrary, by the water slipping under the gold leaf just laid, you will find that this spreads infinitely more easy, and almost of itself; it sticks faster on the gold size, never scratches, is more easily dusted for burnishing, or matting with size; in short, the work

looks infinitely better in every respect.—As it is impossible, with all possible care, but there may happen some little accident now and then, principally in carved works, you must, in such a case, cut some small bits of gold, which, with a pencil, take and put on the defective places when you look your work over.

12. When the work is perfectly dry, burnish it where you think proper, in order to detach certain parts from the other, to make them set off and shew to better advantage. To that effect use an instrument called a *burnisher*, made either of a real Wolf's tooth, or rather as they now use it, an agate, made in the same form, and finely polished, or else a pebble called *blood stone*.—Before burnishing, you must, with the crooked point of your burnisher, push down all the parts of gold in the hollow parts which you forgot to do with the pencil, then dust it with a large one. When the work is burnished where you want it to be so, matt and repass, with a very soft pencil and burnish gold size, what has not been burnished; or, you may again put some vermillion, to raise the gold, and make it look brighter; which is called, in term of art, *repassing*.

13. There is again another repassing you must not forget, which is to lay, in all the hollow places of a carved work, a coat of a composition of a vermillion, as I am going to prescribe, and which will give an incomparable fire to the gold, and make it look as goldsmith's work. This composition is such.—Grind together, on marble, some vermillion, gamboge, and red brown, which mix with a little Venetian turpentine, and oil of turpentine—If, after having burnished, matted, and repassed your work, you find again some defective places, you may mend them with gold in shell, which is diluted with a little gum arabic, and applied with a pencil. This sort of faulting is no small addition to the beauty and richness of the work, the French call *buckling with gold in shell*.

III. To gild without gold.

Put in a crucible one ounce of ammoniac salt, and half that

that quantity of common mercury. Cover and lute well¹ the crucible for fear the mercury should exhale. Give this a small fire for the space of half an hour. Increase the fire afterwards till the crucible is quite red hot. Then throw the composition into a pan of cold water. As soon as this matter is cold, it will be as hard as a stone. Break and grind it, and dissolve it in gum water. Wherever you lay a coat of this, it will look like gilt.

IV. *Another to the same purpose.*

To gild frames, and other common things, pulverise and incorporate well together the yolk of an egg with two ounces of mercury, and one of ammoniac salt. Put this into a matrass, stop it well, and set it, for four and twenty days, in hot horse dung.

V. *A gold without gold.*

Grind some purpurine with water; then put it to soak with chamber-lye in a pan; stir and skim it. When it has done throwing any scum, decant the chamber-lye, and supply it by gum water. Whatever you write or draw with this composition will look as gold itself; and it admits even of being burnished with the burnisher.

VI. *The preparation of the gum-water.*

In half a pint of common water, put two ounces of gum-arabic, bruised in small bits. When dissolved, it makes the right degree of gum-water to be used for the above purpose.

VII. *To write in gold or silver.*

Draw the juice of juniper leaves. In this juice throw some gold or silver filings, which set there to infuse for three days: then make the trial.

VIII. *To gild on glasses, earthen, or china wares.*

Take a glass, or china cup, wet it, and lay your gold where and how you like, then let it dry. Dissolve some

borax in water, and of this liquor lay a coat on your gold. Set it in the fire till your glass powder in melting makes a varnish on the gilded parts, which will then appear very beautiful.

IX. To write, or paint, in gold colour.

Pulverise some purpurine into subtile powder; then water it over gently, and by little at a time, with chamber-lye, turning incessantly, while you pour, with a stick. Let it settle, and wash it in common water, so many times till you see the water comes out at last quite clear. Each time you change the water take particular care to allow a sufficient time for the settling. Then mix after the last water is poured away, some powder of saffron and gum water with your ground, and either write or paint, which you like. This secret is by no means an indifferent one; and you will find it very agreeable if you try.

X. To write, or paint, in silver, especially with a pencil.

Pound well, in a bell metal mortar, some tin glass; then grind, and dilute it, on porphyry, with common water. Let it settle, and throw off the water, which will be black and dirty. Reiterate this lotion so many times till the water remains clear. Then dilute it in gum-water, and either write or paint with it. It will appear very handsome, and no ways inferior to the finest virgin silver.

XI. To whiten and silver copper medals.

1. Take filings from Cornwall pewter, and make a bed of them at the bottom of a pipkin. On this bed lay one of your meda's, taking care however they should not touch each other. Make another bed of filings over these medals, and one of medals again on these filings. Continue this alternate stratification of medals and filings, till you have laid all the medals you wanted to whiten.

2. When this is done, fill up your pan with water, and put on it a powder composed of roch-alum and tartar from

from Montpellier, well grinded and mixed together. Boil the whole till the whitening of the medals is complete.

N. B. They must have previously been cleansed with soft sand, or strong lye, to purge them from any grease.

XII. *A water to gild iron.*

In three pounds of river-water, boil roch-alum, one ounce, Roman vitrios as much, verdigrease half an ounce, gem salt three, and orpine one. Then add tartar half an ounce, and the same quantity of common salt. Boil it again with this addition. Now heat your iron, and when warm, rub it over with this stuff quite hot, then dry it by the fire, and burnish.

XIII. *To whiten exteriorly copper statues.*

Take silver-crystals, ammoniac, gem, common and alkali salts, of each of all these two drachms. Make all into a paste with common water. Lay your figures over with it, and set them on red-hot charcoals till they smoak no more.

XIV. *To write in gold letters on pots, or boxes.*

Dissolve ifinglafs in water. When reduced into a size, or glue, dilute some red tartar with it, after having made it into a very subtile powder. With this mixture, and a pen, or a pencil, write on your pots or boxes; then put a thick gold leaf on it of the same sort as metal-gilders use. And, when this is dry, burnish as usual.

XV. *To gild silver in water-gilding without the assistance of mercury.*

1. Take first the finest gold, forge it weakish, then cut it in bits and neal it, on an iron plate, or in a crucible.

2. Have next a glass matrass, put your gold in, and to every drachm of gold, put half a pound of ammoniac salt, and two ounces of good aquafortis. Cover the matrass with a sheet of paper, turned conically by one of its cor-

ners upon one of the long sides, so as to form a funnel with the smaleſt, and not quite close, but terminated in a ſmall orifice, to give a free paſſage to the fumes of the *aqua-fortis*. Set this matraſs on a very ſlow fire, that the gold may have time to diſſolve gently and gradually, and ſhake often the matraſs to help the diſſolution. Be very careful not to make the fire too ſtrong; for the gold would infaſtly ſublime and waste itſelf all into vapours.

3. When the gold is entirely diſſolved, pour this liquor into a glaſs, or china bowl; wet ſome old coarse linen rags on them, which ſet to drain on ſmall ſticks on another bowl, dying the ſame with what drains from them till you have uſed all your liquor; then dry them before a gentle fire.

4. When dry, lay them on a marble ſtone, and ſet them on fire. And as ſoon as they are conuoked, grind them into a fine powder, which put afterwards into a crucible on a little fire. When this powder is lighted like ſparkles of fire, put it on the marble again, and ſtir it with an iron rod till you ſee no more fire. Grind it then again as before, as much as you poſſibly can, and it is fit for gilding any ſort of ſilver work you please.

XVI. *The ſauce to be uſed for colouring ſilver plates, gilt with the above deſcribed powder.*

1. Grind well together, into a ſubtile powder, ſulphur and pearl aſhes, of each one ounce, and two of common ſalt.

2. Then, when you want to colour your gilt plates, have a quart of water, and half a pint of chamber-lye, in which mix a large ſpoonful of the above powder. Set this to boil in a red copper pot, very clean. When this ſauce boils, hold the plate with a ſilver wire, and then plunge it in; there leave it for about a minute, or two at moſt; then take it out again by the ſame wire without touching it with your hands, and plunge it in the ſame manner in cold clean water. Should it then not looſe high coloured to your ſatisfaction, put it again in as before, till you find it ſufficiently coloured.

3. The next step is to give the piece thus coloured to the burnisher, with a strict charge not to use any vinegar in his burnish. This receipt is a very good and particular secret.

XVII. *A water which gilds copper and bronze. A secret very useful for watch and pin makers.*

Dissolve equal parts of green vitriol and ammoniac salt in good double distilled vinegar; then vaporate the vinegar, and put it in the retort to distil. If in the product of the distillation you steep your metal after being polished and made hot, it will come out perfectly well gilt.

XVIII. *Another.*

Take burnt copper and ammoniac salt, equal parts; *alumen plumeum*, four ounces; common salt decrepitated, as much. Dissolve the whole in double distilled vinegar, then vaporate this vinegar. Distil from the rest an *aqua-fortis*, in which if you extinguish, five or six times, brass, copper, iron, or silver, made hot, these metals will assume the colour of gold.

XIX. *To gild steel or iron, after being well polished.*

Take seven ounces of erpine; *terra merita*, one and a half; sucotrine aloes, four and a half; gamboge, three and a half. Put all into powder, and put it in a retort, with so much of pickle water as will cover these powders by two fingers. Stir well, and mix all together, let it infuse four and twenty hours and distil. With the liquor which comes from the distillation, keep by for use, rub the steel, iron, or copper, and set it to dry in the shade.

XX. *To silver copper figures.*

1. Cleanse well first the figures with a strong lye, made with either pearl or brill ashes, or common salt, or alum, no matter which. Wipe them well when done, and rub them with a composition of tartar and ammoniac salt

mixed (by means of *aquafortis*) with a little dissolution of silver.

2. Now with a piece of leather, wetted in your spittle, take of these powders, and rub the copper figures till they are sufficiently silvered.

XXI. To silver or gild pewter.

1. Take one of the finest and most delicate goldsmith's wire-brushes; rub your pewter with it so as to mark it with the strokes of the brush. When done, lay a double gold or silver leaf on that place of the pewter; then put over it a piece of skin or leather, and over that skin some putty. With a burnisher rub, for a good while, on that putty; then with a piece of pewter on the naked gold without either skin or putty.

2. Have a care that the pewter be very clean, and that your breath should not go over it. Therefore, to do that operation, you must put your handkerchief before your mouth, and manage it so in tying it, that there should be a passage preserved on each side of your face which should drive your breath along your cheeks, round your head, and quite up behind your ears.

XXII. A composition to lay on lead, tin, or any other metal, in order to hold fast the ready gilt leaves of pewter which are applied on it; useful for gilding on high steeples, domes, &c.

1. Melt together, on a slow fire, black pitch, two pounds; oil of turpentine, four ounces; and a little rosin. When the whole is dissolved and mixed well into a kind of varnish, lay a coat of it on your work.

2. Upon steeples, the common method of gilding cannot, on account of the wind, be practised; have only the exact measures and dimensions of the place intended to be gilt, then, at home, and at leisure, cut to them some fine leaves of pewter, and gild them as usual. When done, you have no more to do but to carry up these pewter leaves, rolled in a basket, and having burnished the place on which they are to be applied with the

the above composition, lay the gilt pewter leaves on it, and they will stand fast enough.

XXIII. *To clean and whiten silver.*

1. Rasp four ounces of dry white soap in a dish. Pour a pint of warm water on it.—In another dish put a penny-worth of wine lye dried in cakes, and the same quantity of the same water.—In a third dish put also another penny-worth of pearl ashes, with another similar quantity of the same water.

2. Then, with a hair brush steeped first in the wine lye, then in the pearl ash, and lastly in the soap liquors, rub your silver plate, and wash it afterwards with warm water, and wipe it with a dry cloth kept on a horse before the fire for that purpose.

XXIV. *The preparation of gold in shell.*

Take ammoniac salt, and gold leaves, equal quantities. Bruise this in a mortar for two or three hours, and towards the end add a discretionable quantity of honey.

XXV. *To bronze in gold colour.*

Rub the figure first with *aqua fortis*, in order to cleanse and ungrease it well. Then grind on porphyry, into a subtile powder, and mix with lintseed oil, equal quantities of *terra merita* and gold litharge. With this composition paint the figure over.

XXVI. *Another to the same purpose.*

Take gum elemy, twelve drachms, and melt it. Add one ounce of crude mercury, and two of ammoniac salt. Put all in a glas phial, and set it in a pot full of ashes; lute well the phial, and melt the contents. When perfectly dissolved, add a discretionable quantity of orpine and brass filings; mix all well, and with a pencil paint what you will over with it.

XXVII. *How to matt burnished gold.*

Grind together blood-stone, and vermillion with the white of an egg. Then with a pencil lay it in the bottom grounds.

XXVIII. *How to do the same to burnish silver.*

Grind ceruse-white with plain water first, then with a very weak ifinglass water, and make the same use of this as of the other.

XXIX. *The method of applying gold, or silver, in shell, on the wood.*

Black wood, or that which is dyed so, is the fittest to admit of this operation. The method of applying it is this.

1. Take a little gum adragant, which dilute in a good deal of water, to make it weak. With this weak gum water dilute your gold or silver; and with a pencil, lay it on such places of your work as receive and shew the light, without touching on those which are the shades. To express these, touch the parts with indigo diluted in a very weak gum arabic water.

2. When this is done, lay one coat of drying varnish, made of oil of spike and sandarac. If the varnish be too thick, thin it with a little oil; and in mixing it, take care not to boil it so hard but you may bear some on your hand without scalding the place.

N. B. Have attention to make your gum-waters for this sort of work always very weak; otherwise they would tarnish and spoil all the gold or silver.

XXX. *To gild sandy gold.*

Take any colour, and grind it either with oil, or with gum. Lay a few coats of it on your work, according as you think there may be need of it. When dry, lay one coat of size, and while it is still fresh, sift some brass filings on it; let it dry so, and varnish it afterwards.

XXXI. *Varnish*

XXXI. Varnish to be laid on gilding and silvering.

Grind verdigrease, on marble, with common water, in which you have infused saffron for eight hours.

XXXII. The method of bronzing.

Take three pennyworth of spal, one of litharge, a gill of lintseed oil, and boil the whole to the consistence of an unguent. Before you apply it, dilute the quantity you intend to make use of with turpentine oil, and lay a coat of vermillion on the work before bronzing.

XXXIII. A water to gild iron with.

1. Put in a glass bottle, with a pint of river water, one ounce of white copperas, and as much of white alum; two drachms of verdigrease, and the same quantity of common salt. Boil all together to the reduction of one half. Then stop the bottle well for fear the contents should lose their strength.

2. To gild the iron with it, make it red hot in the fire, and plunge it in this liquor.

XXXIV. To make the fine writing gold.

1. Take gold in shell, and sulphur, in the proportion of ten drachms of this, well grinded on porphyry and amalgamated, to every sequin-worth of the other. Put this mixture into a proportionable leather bag, in which work it continually for the space of two days, then pour all into a crucible, and burn it on a slow fire. This done, wash what remains with filtered lime water, and by filtration also, get your water out again from the composition. If after this operation, you do not find it high enough yet in hue, wash it again and again in the same manner, till it looks fine.

2. To apply it, dilute some bol armenian with isinglafs, and write what you please, and let it dry; then apply your gold, and when dry burnish it.

XXXV. How

XXXV. *How to get the gold or silver out of gilt plates.*

1. Mix together one ounce of aquafortis, and one of spring water, with half an ounce of common, and one drachm of ammoniac salts. Put all on the fire, and boil it; then put in the plate to soak from which you want to get the gold or silver out. A little while after, take your plate out, and scrape it over the liquor.

2. The gold will remain suspended in this regal-water; and to make a separation of them, pour in it double the quantity of common water; or again, throw a halfpenny in it, and boil it, and all the gold will fix itself to it.

XXXVI. *To gild paper on the edge.*

1. Beat the white of an egg in three times its quantity of common water, and beat it till it is all come into a froth. Let it settle into water again, and lay a coat of it on the edge of your paper.

2. Next lay another of bol armenian and ammoniac salt, grinded with soap suds. Then put the gold, and let it dry, before burnishing it.

XXXVII. *To gild on vellum.*

Mix some saffron in powder, with garlick juice. Put two or three coats of this on the vellum, and let it dry a little, but not quite. Then breathing on the coat, apply the gold leaf with cotton; and when dry, burnish it.

XXXVIII. *Another way.*

Lay first a coat of lime and burnt ivory, grinded together with a weak ifinglafs water. Apply the gold on it; and when dry, burnish it.

XXXIX. *Another way.*

Grind and mix together four ounces of bol armenian, one of aloes, and two of starch; dilute it in water, and lay a coat of it on the vellum, then the gold immediately. When all is dry, burnish it.

XL. *A gilt without gold.*

Take the juice from saffron flowers, in the season, or dry saffron in powder, with an equal quantity of yellow orpine well purified from its earthy particles. Grind all well together, and put it a digesting in hot horse dung for the space of three weeks. At the end of that term you may use it to gild whatever you like.

XLI. *To gild without gold.*

Open a hen's egg by one end, and get all out from the inside. Re-fill it again with chalidonia's juice and mercury; then stop it well with mastich, and put it under a hen which just begins to set. When the time of hatching is come, the composition will be done, and fit for gilding.

XLII. *To gild on calf and sheepskin.*

Wet the leather with whites of eggs. When dry, rub it with your hand, and a little olive oil; then put the gold leaf, and apply the hot iron on it. Whatever the hot iron shall not have touched will go off by brushing.

XLIII. *Gold and silver in shell.*

1. Take saltpetre, gum arabic, and gold leaves, and wash them all together in common water. The gold will sink to the bottom, whence pouring the water off you may then put it in the shell.

2. The silver is worked in the same manner, except the saltpetre, instead of which you put white salt.

XLIV. *To gild marble.*

Grind the finest bol armenian you can find with lintseed or nut oil. Of this you lay a coat on the marble, as a kind of gold size. When this is neither too fresh, nor too dry, apply the gold; and when thoroughly dry, burnish it.

XLV. *To apply gold on glazed wares, chrystal, glass, china, &c.*

Take a penny-worth of lintseed oil, and as much of gold

gold litharge; a halfpenny-worth of umber, and as much of ceruse. Grind all together on marble; and with a little hair pencil, dipped into the said colour, draw whatever you will on the abovementioned wares. As soon as dry, lay your gold on it with cotton, which p'ss along your cheek before taking the gold with it. And as soon as this is perfectly dry, burnish it.

XLVI. Matt gold in oil.

Take yellow ochre, a little umber, white and black lead, which grind all together with greasy oil, and use it when necessary.

XLVII. To dye any metal, or stone, gold colour, without gold.

Grind together in a subtile powder ammoniac salt, white vitriol, saltpetre, and verdigrease. Cover the metal, or stone you want to dye, all over with this powder. Set it thus covered, on the fire, and let it be there a full hour; then taking it out, plunge it in chamber-lye.

XLVIII. To whiten copper.

Take one ounce of zinc, one drachm and a third part of it of sublimed mercury. Grind all into powder, then rub with it what you want to whiten.

XLIX. To whiten silver without the assistance of fire.

Take *Mons martirum's* talo, which calcine well in an oven till it can be pulverised. Sift it very fine. Then dipping a piece of cloth or stuff in it, rub the silver with it.

L. To whiten iron like silver.

Mix ammoniac salt powder, and quick-lime, in cold water. Then make your iron red-hot several times, and each time, plunge it in that dissolution. It will turn as white as silver.

C H A P. VIII.

The Art of DYING WOODS, BONES, &c.

I. *The composition for red.*

1. CHOP Brasil wood very fine, and boil it in common water, till it has acquired an agreeable colour; then strain it through a cloth.
2. Give your wood first a coat of yellow, made of saffron, diluted in water. Then the wood being thus previously tinged with a pale yellow, and dried, give afterwards several coats of the Brasil wood water, till the hue pleases you.
3. When the last coat is dry, burnish it with the burnisher, and lay another coat of drying varnish with the palm of your hand; and you will have a red orang'd very agreeable.
4. If you want a deeper red, or rather a darker, boil the Brasil wood in a water impregnated with a dissolution of alum, or quick lime.

II. *Another red.*

Soak the chopped Brasil wood in oil of tartar; and with it rub your wood, proceeding for the rest as above directed.

III. *Another way.*

Pound orchanetta into powder: mix it with oil of nut; make it lukewarm, and rub your wood with it. The rest as above.

IV. *To*

IV. *To dye wood in a purplish colour.*

Soak Dutch turnsol in water; add a tincture of Brasil wood made in lime water; and you will obtain a purple, with which you may dye your wood, and then burnish and varnish as usual.

V. *A blue purple.*

Take that sort of German turnsol which painters use with size. Dissolve it in water, and strain it through a linen cloth. Give a coat of this dye to the wood; and if the hue be too strong, give it another coat of a paler dye, by adding clear water to a part of the other. When dry, burnish it as usual.

VI. *Another.*

Four ounces of Brasil, and half a pound of India woods, boiled together in two quarts of water, with one ounce of common alum.

VII. *A blue for wood.*

Slack lime in water, and decant it out of the ground. In three pints of this water dissolve four ounces of turnsol, and boil it one hour. Then give several coats of it to your wood.

VIII. *A green.*

Grind Spanish verdigrease into a subtil powder with strong vinegar. Add and mix well with this, two ounces of green vitriol. Boil all of it a quarter of an hour in two quarts of water, and put your wood a-soaking till the colour be to your liking. For the rest proceed as above.

IX. *A yellow.*

Dissolve turnsol in two quarts of water. Then grind some indigo on marble with that water, and set it in a vessel on the fire with weak size to dilute it. When done, give a coat of this dye to your wood with a brush, and when dry, polish it with the burnisher.

X. *Another*

X. *Another yellow.*

Boil in water some grinded *terra merita*, and soak your wood in it afterward.

XI. *Another finer yellow.*

Four ounces of French berries, boiled for about a quarter of an hour in a quart of water, with about the bulk of a filbert of roch-alum. Then soak the wood in it.

XII. *To dye wood in a fine polished white.*

Take the finest English white chalk, and grind it in subtle powder on marble, then let it dry, and set it in a pipkin on the fire with a weak sized water, having great care not to let it turn brown. When it is tolerably hot, give first a coat of size to your wood, and let it dry: then give one or two coats of the aforesaid white over it. These being dry also, polish with the rushes, and burnish with the burnisher.

XIII. *To dye in polished black.*

Grind lamp-black on marble with gum water. Put it next in a pipkin, and give a coat of this, with a brush, to your wood; then polish it when dry.

XIV. *Another way.*

Soak bits of rusty iron in the best black ink. A few days after rub your wood with it, and when you see it well penetrated and dry, polish it with the burnisher.

XV. *To imitate ebony.*

Infuse gall-nuts in vinegar, wherein you have soaked rusty nails; then rub your wood with this; let it dry, polish and burnish.

XVI. *Another way.*

Chuse a good hard wood, and not veiny, such as pear, apple, or hawthorn trees, and blacken them. When black,

black, rub them with a bit of cloth; then with a reed brush, made on purpose, dipped in melted wax, mixed in a pot with common black, rub your wood till it shines like ebony.

XVII. *Another way.*

Holly is a very fit sort of wood to take the dye of ebony. Form it first into the shape you intend to give it, then put it in a hatter's copper to boil, leave it till it has acquired a perfect degree of blackness. Then take off the filth of the dye, and polish it as you would ebony, with rushes, &c.

XVIII. *A fine black easily made.*

Take good ink, put it in a stone pan, new and well sealed, then set it in the sun to exsiccate it into a cake. When dry, take and scrape it out from the pan with a knife, and grind it into an impalpable powder on marble. This powder, diluted with varnish, will produce a fine black.

XIX. *To dye wood silver fashion.*

Pound tin glass, in a mortar, and reduce it into powder. Add water to it by degrees, till it comes into a liquid like liquor for painting. Put it in a clean pipkin, with size, and set it on the fire to warm. Brush your wood with this liquor; and when it is dry, burnish it.

XX. *To dye in gold, silver, or copper.*

Pound very fine, in a mortar, some roch-crystal with clear water. Set it to warm in a new pipkin with a little size, and give a coat of it on your wood with a brush. When dry, rub a piece of gold, silver, or copper, on the wood thus prepared, and it will assume the colour of such of these metals as you rub it with. After this is done, burnish it as usual.

XXI. *To give nut, or pear tree, what undulation you like.*

Slack some quick lime in chamber lye. Then with a brush

brush dipped in it form your undulations on the wood according to your fancy. And when dry, rub it well with a rind of pork.

XXII. *To imitate the root of nut-tree.*

Give seven or eight coats of size to your wood, till it remains shiny. Then before your size is quite dry, strike here and there a confused quantity of spots with bistre grinded with common water. When dry, varnish it with the Chinese varnish.

XXIII. *To give a fine colour to the cherry tree wood.*

Take one ounce of orchanetta; cut it in two or three bits, and put it to soak for forty-eight hours in three ounces of good oil of olive. Then with this oil anoint your cherry-tree wood after it is worked and shaped as you intend it: it will give it a fine lustre.

XXIV. *To marble wood.*

1. Give it a coat of black diluted in varnish. Repeat it one, two, three, or as many times as you think proper; then polish it as usual.

2. Dilute some white varnish made with white gum, or shell-lac, and white sandarac. Lay this white on the black ground, tracing with it what oddities you like. When dry, give a light rub with rushes, then wipe it, and give a last coat of fine transparent white varnish, in order to preserve the brightness. Let this dry at leisure, then polish it.

XXV. *To imitate white marble.*

Break and calcine the finest white marble you can find; Grind it as fine as you possibly can, and dilute it with size. Lay two coats of this on your wood, which, when dry, polish and varnish as before directed.

XXVI. *To imitate black marble.*

Burn some lamp black in a shovel, red hot, then grind it

it with brandy. For the bigness of an egg of black, put the size of a pea of lead in drops, as much of tallow, and the same quantity of soap. Grind and mix these together, then dilute it with a very weak size water. Give four coats of this; and, when dry, polish as usual.

XXVII. *A counter-faction of coral.*

1. Reduce goat's horns into a subtile powder. Put it in a clear lye made of lime and pearl ashes. Let it there rest for a fortnight. When reduced into a palp, add cinnabar in powder, or dragon's blood in tears, pulverised very fine, in what quantity you may judge necessary to give the quantity of matter you have got a fine and perfect coral hue.
2. Next boil this composition till it comes very thick; then take it off from the fire and mould it in moulds shaped in forms of coral. Or else cast it again in what other sorts of moulds you like, to make figures of it, and other sorts of work, which will produce a fine effect.

Observation. This secret was worth immense sums of money to him who found it out. The Turks paid them magnificently. But this branch of trade was soon put to an end by the cheats which were practised with the merchants of Tunis and Algiers.

XXVIII. *To take the impression of any seal.*

1. Take half a pound of mercury; the same quantity of chrystaline vitriol; as much verdigrease. Pulverise well these two last ingredients, and put them along with the first in a new iron pan, with smith's forge water. Stir all well with a wooden spatula, till the mercury is perfectly incorporated with the powders. Then wash that paste with cold water, and change it till it remains quite clear as when you put it in. Put the lump in the air, it will harden.

2. When you want to take the impression of a seal with it, take it and place it over the fire on an iron plate. When there appears on it some drops like pearls, then it is hot enough; take it off and knead it in your hands with your fingers, it will become pliable like wax; smoothen

smoothen one side of it, and apply it on the seal, pressing it to make it take the impression. When done, lift it up, and set it in the air, where it will come again as hard as metal, and will serve you to seal the same letter, as the original seal itself, without any probability of discovering it, should even the real one be laid on it.

XXIX. *Another way.*

Heat some mercury in a crucible, and silver filings in another, in the proportion of two parts of mercury to one of silver. As soon as the mercury begins to move, pour it on the silver filings. Let this cool, and then put it in a glass mortar. Pound it well with a pestle of the same, and add a little water in which you have dissolved some verdigrease. Stir this for three days, five or six times a day. Decant out the verdigrease water, and replace it with good vinegar, with which pound it again in the same mortar, as before, a couple of hours, changing vinegar as soon as it blackens. Pound it again, two other hours, with chamber lye instead of vinegar, changing it the same, during that time, as you did the vinegar.— Then take that matter, lay it on a wash-leather skin, which bring up all round it, and tie it above with a string. Press the lump well in that skin, so as to separate and squeeze out all the superfluous mercury which passes through the leather. And when none comes out any longer, open the skin, take the lump in your hand, and knead it, and smoothen one side of it to take the impression you like, proceeding for the rest, as above directed. It hardens in the air, and softens with the heat of the hand, as you would do a piece of wax.

XXX. *To get birds with white feathers.*

Make a mixture of *semper-vivum-majus*'s juice, and olive oil, and rub with it the eggs on which the hen is setting. All the birds which shall come from those eggs will be white feathered.

XXXI. *To soften ivory.*

In three ounces of spirit of nitre, and fifteen of white wine,

wine, or even of mere spring water, mixed together, put your ivory a-soaking. And, in three or four days, it will be so soft as to obey under the fingers.

XXXII. *To dye ivory thus softened.*

1. Dissolve, in spirit of wine, such colour as you want to dye your ivory with. And when the spirit of wine shall be sufficiently tinged with the colour you have put in, plunge your ivory in it, and leave it there till it is sufficiently penetrated with it, and dyed inwardly. Then give that ivory what form you will.

2. To harden it afterwards, wrap it up in a sheet of white paper, and cover it with decrepitated common salt, and the driest you can make it to be; in which situation leaye it twenty-four hours.

XXXIII. *Another way to soften ivory.*

Cut a large root of *mandrake* into small bits, and infuse first, then boil it, in water. Put your ivory in this boiling liquor, and boil it too, till it is as soft as wax.

XXXIV. *To whiten ivory, which has been spoiled.*

Take roch-alum, dissolve it in water, in a sufficient quantity, to render the water all milky with it. Boil this liquor, and soak your ivory in it for about one hour, then rub it over with a little hair brush. When done, wrap it in a wet piece of linen to dry it leisurely and gradually, otherwise it would certainly split.

XXXV. *To whiten green ivory: and whiten again that which has turned of a brown yellow.*

1. Slack some lime into water, put your ivory in that water, after decanted from the ground, and boil it till it looks quite white.

2. To polish, set it on the turner's wheel, and after having worked it, take rushes and pumice-stone subtile powder with water, and rub it till it looks perfectly smooth. Next to that, heat it, by turning it against a piece of linen, or sheeps-skin leather, and when hot, rub it over with a little whitening diluted in oil of olive, continuing

tinuing turning as before ; then with a little dry whitening, and a piece of soft white rag. When this is performed the ivory will look as white as snow.

XXXVI. *To petrify wood, &c.*

Take equal quantities of gem salt, roch-alum, white vinegar, calx, and pebbles powder. Mix all these ingredients together, and there will happen an ebullition. If, after it is over, throw in this liquor any porous matter, and leave it there a-soaking for three, four, or five days, they will positively turn into petrifications.

XXXVII. *To imitate tortoiseshell with horn.*

Take one ounce of gold litharge, and half an ounce of quick lime. Grind all together, and mix it to the consistence of pap, with a sufficient quantity of chamber-lye. Put of this on the horn ; and three or four hours afterwards it will be perfectly marked.

XXXVIII. *A preparation for the tortoiseshell.*

Make a mixture, as above, of quick lime, orpine, pearl ashes, and aquafortis. Mixed well together, and put your horn or tortoiseshell a soaking in it.

XXXIX. *To dye bones, and mould them in all manner of shapes.*

1. Boil together twelve pounds of quick lime, and one of calcined roch-alum, in water, to the reduction of one third. Add, then, two more pounds of quick lime, and boil it again till it can carry an egg, without its sinking to the bottom. Let it cool, then filter it.

2. Take twelve pounds of that liquor ; half a pound of rasped Brasil wood, and four ounces of scarlet flocks ; boil all about five minutes on a slow fire, then decant the clearest part of it, and put it by. Put on the *fæces* of Brasil and scarlet about four pounds of the first water ; boil it the same time as the other, and decant likewise the clearest part of it on the other. Repeat this operation,

till the new added water draws no more colour from the *fæces*.

3. Now rasp any quantity of bones, and boil them in clear lime water. Then take them out. Put them in a matrass; and, over them, pour some of the tinged water, so as to soak them. Place the matrass on a mild sand bath, and evaporate the liquor. Add some more liquor, and evaporate it again, continuing to add and evaporate the tinged liquor, till the rasped bones are all turned into a soft paste.

4. Take this paste, and mould it as you like, in tin or other moulds, to make whatever thing or figure you want. Set it in the mould for a day or two, till it has acquired the shape you would have it; then, to harden it, boil it in a water of alum and saltpetre first, and afterwards in oil of nut. These figures look incontestibly to be made of bones, without conceiving how they can be made such, out of that matter, and in one solid piece.

XL. To dye bones in black.

Take six ounces of litharge, and the same quantity of quick lime. Boil all in common water, along with the bones. Keep stirring, till the water begins to boil. Then take it out, and never cease stirring till the water is cold again: by that time the bones will be dyed black.

XLI. To soften bones.

Take equal parts of Roman vitriol and common salt. Distil the spirits out by the report. If in the water you get from the distillation, you put the bones a soaking, they will become as soft as wax.

XLII. To dye bones in green.

Pound well together, in a quart of strong vinegar, three ounces of verdigrease, as much of brass filings, and a handful of rue. When done, put all in a glass vessel, along with the bones you want to dye, and stop it well. Carry this into a cold cellar, leave it for a fortnight, the bones will be dyed green.

XLIII. *A salt for hardening soft bones.*

Take equal quantities of ammoniac, common decrepitated and gem salts, as well as of *plumeum*, *saccarinum*, *roch* and *shell* alums. Pulverise, and mix all together; then put it in a glass vessel well stopped, which bury in hot horse dung, that the matter should melt into water. Congeal it on warm embers. Then make it return into a *delequium* again, by means of the horse dung, as before. When thus liquified for the second time, it is fit for use. Keep it, to harden and consolidate any thing, smear it over with it.

XLIV. *To make figures, or vases, with egg-shells.*

Put egg shells in a crucible, and place it in a potter's furnace, for two days, that they may there be perfectly calcined; then grind them dry into a subtile powder.

2. Next, with gum-arabic water and whites of eggs beaten together, make a liquor, with which knead that powder, and make a paste or dough of it.

3. With that dough, to which give the consistence of potter's clay, make and form whatever figure or vase you like, and set them in the sun to dry.

XLV. *To dye bones and ivory of a fine red.*

1. Boil scarlet flocks in clear water assisted with pearl ashes, to draw the colour the better; then clarify it with *roch-alum*, and strain this tincture through a piece of linen.

2. To dye, afterwards, any bones or ivory in red, you must rub them first with *aquafortis*, and then immediately with this tincture.

XLVI. *To make a paste in imitation of black marble.*

Dissolve two ounces of spalt on a gentle fire, in a glazed pipkin. When in perfect fusion, add a third part of *harabe*, which must be ready melted, stir all together. When both are well mixed and united, take the pipkin

off the fire, and throw the contents, boiling hot, into a mould of a fine polish in the inside. When cold and dry, take the piece off from the mould, and you will find that nothing can imitate so well black marble as this deceptive composition.

XLVII. *To dye marble, or alabaster, blue or purple.*

1. Pound together in a marble mortar, parsnips and purple lilies, with a sufficient quantity of white wine vinegar. Proportion the quantity of parsnips and lilies to each other, according to the hue you wish to give the liquor. If you cannot get one of these two juices, make use of that you can get; and to every one pound of liquor, mixed and prepared, put one ounce of alum.

2. In this dye put your marble or alabaster, and boil them, supposing that they are not too considerable to go into the vessel with the liquor. And if they be, you must heat one part of it as much as you possibly can, then dye it with the liquor boiling hot, and thus proceed from place to place, till you have dyed it all over.

C H A P. IX.

How to Cast FIGURES in MOULDS.

I. *How to cast figures in moulds.*

TAKE one pound of Paris-plaister, and an equal quantity of bricks, pounded into an impalpable powder ; join to this one ounce of *alumen plumeum*, and one of ammoniac salt. Dilute all together, gradually, in clear water, without observing it, as you are to make a paste of it ; and make your moulds with it.

II. *To cast a figure in bronze.*

1. Make a pattern with proper clay, mixed with sand, to prevent its cracking, when it comes to dry. 2. When the pattern is completed mould it with plaster while it is still damp, because in drying, the parts of the pattern shrink, and lose their fullness. To that effect begin by the bottom part of the figure, which cover with several pieces, and by rows ; as for example, let us suppose the first row from the feet to the knees ; the second from the knees to the beginning of the belly ; the third from the beginning of the belly up to the pit of the stomach ; from thence to the shoulders, on which lay the last row, which is to contain the head.—Observe, however, that those divisions of rows admit of no particular rule, and ought to be entirely determined by, and adapted to the size of the figure. For when the pieces are made too considerable, the plaster works too much, and fatigues itself, which is detrimental to its taking a true and precise impression of all the turns and shapes of the figure. So that at any rate, it is always preferable to make the pieces of the mould smaller than larger.

3. Observe, that if the figure you are moulding has got any draperies, or ornaments, which require a good deal of trouble and nicety, you cannot help making a great many small parts and subdivisions in your mould, in order to enable you to strip them off the figure afterwards.

wards with more facility. Fix little rings to assist in pulling them off more easily, cover them all over with larger pieces, which contain several of the little ones.

4. When the mould is thus made and completed, you let it rest till it is perfectly dry. Then, before using it, they who are curious in their work do not content themselves with imbibing it inwardly with oil, but they even make it drink as much wax as it can soak, by warming those separate pieces, and putting wax in them to melt.—The motive in doing this is to render the wax-work, which is to be cast in it, finer and more perfect. For if you imbibe the mould with oil only, the wax figure cast in such a mould always comes out a little rough and like flour, because the wax draws always the superficy of the plaster, and in reverse, the plaster draws also the superficy of the wax, which produces a great defect in the figure, and is a great obstacle to its coming out from the mould with that neatness it otherwise should.

5. The mould being therefore thus imbibed with wax, if you want it for a bronze figure, you assemble all the small parts of it each in their cases, and with a brush give them a coat of oil. Then, with another brush, give them another coat of wax, prepared as follows.—Six pounds of wax, half a pound of hog's lard, and one pound of Burgundy pitch—This preparation of the wax, however, must be regulated according to the country and the season. For in the heat of summer, or hot climes, such as Spain, Italy, and France, wax may be used alone, as it keeps naturally soft, and the other drugs above-mentioned, are added to it only to render it more tractable. Of this wax, whether prepared or natural, you lay another coat in the hollow of the mould, to the thickness of a sixpenny piece. Then, with wax made in flat cakes, of the thickness of a quarter of an inch, more or less, according to that you are willing to give your metal, you fill all the hollow parts of the mould in pressing hard this sort of wax in them with your fingers. When thus filled, you have an iron grate, larger by three or four inches every way than the plinth or basis of the figure. On the middle of that grate you erect one or more iron bars, contoured agreeable to the latitude and situation

situation of the figure, and bored, from space to space, with holes to pass other iron rods of the size and length necessary to support the *core* (in French *ame* or *noyau*) of what you want to cast.

6. Formerly they used to make their *cores* with potter's clay mixed with hair and horse dung, well beaten together. With this compost, they formed a figure like the pattern; and, when they had well supported it with iron bars, length and cross-ways, according to its position and attitude, they scraped it, that is to say, they diminished, and took off from its bigness as much as they wanted to give to their metal. When that *core* was dry, they took the wax with which they had filled the hollow parts of their mould, and covered it with them. — This method is even practised now by some founders, especially for great bronze figures, because earth resists better the power of that red-hot melted metal, than plaster can; and this they reserve only for small figures, and those which are cast in gold or silver. However, when plaster is well beaten and mixed with brick dust also well beaten and sifted fine, it stands pretty well too. We shall therefore proceed on the method of casting on plaster *cores*.

7. You take then the first, or bottom rows of the mould, filled by the last wax in cakes, as mentioned before, and assemble them on the iron grate round the principal iron bar, which is to support the *core* when made. When they are joined together, you give them a tie round very hard with cords, lest they should vary from their position when you form the *core*.

8. To form this, as soon as the first set which completes the bottom row of the separate pieces of the mould is fixed, you pour plaster, diluted very clear, and mixed, as we said, with brick dust, with which you fill up that bottom part of the hollow. Then, on this first bottom row of the mould, you place the second in the same manner as the first; then fill it likewise with your prepared plaster. Thus you continue to erect your mould from row to row, till you come to the last, and fill it as you go, with plaster, which is called *forming the core*. If the figure require it, you pass across the *core* some iron

rods through the holes perforated for that purpose in the perpendicular bars, in order to support the *core* the better, and give it more strength and power to resist the effort of the metal when it comes in fusion upon it.

9. When all the pieces of the mould have been thus erected one upon another, and filled with plaster, you must stop a certain time to let it take a consistence, then proceed, to take off the cases and all the smaller parts of the mould contained in each of them, row by row, and one by one, in the same manner as you proceeded to erect them, with this difference, that in erecting them you begin at the bottom, and that in taking them off, you begin at the top; which, when done, leaves the figure to appear all in wax, covering the *core*, which is contained in the inside of it.

10. You are then to proceed to repair the figure, and finish it after the original. The sculptor, in that case, has even an opportunity of perfecting much some of the parts, in adding or taking off according as he thinks proper, to give more grace and expression to certain strokes, muscles, or features only; as for the disposition of the limbs, and their attitude, he can no longer mend or alter them.

11. The figure thus well prepared, you are to place what is called the *pouring* and the *vent holes*. The *pouring holes* are wax pipes of the bigness of an inch diameter for such figures as are of a natural size; for they are to be proportioned not only to the size of the figure, but even to that of the parts of that figure whereon they are placed. The *vent holes* are wax pipes likewise, but of a much lesser size. Those pipes are cast in plaster moulds of what length you please, then cut to that of four or five inches, or thereabouts. They are cast hollow, to the intent of rendering them lighter, otherwise they might as well be cast solid. Those which serve for pouring, are placed in a straight perpendicular line, one above another, at six inches asunder, and sometimes nearer, when there are draperies, and much matter is used.

12. When the various pipes are placed and soldered against the fire, with wax, so that the end which is free should be upwards, and as much perpendicular to the figure

figure as possible, you place another pipe of the same size quite perpendicular, which is to be fixed against every one of the ends of the others. All these pipes, both large and small, serve for the pouring of the matter, and casting of the figure. You are to place three or four of them generally round the figure, which is determined by its size; bulk, and disposition.

13. But at the same time you are placing the pouring holes, you must not neglect placing also those which are to serve for the vent. These last are to be placed in the same line as and with the others, at the distance of four inches only from them, and fixed likewise by one end to the figure, and by the other to another long and perpendicular pipe, like those for pouring. Now, as it is necessary that all the wax, when you come to melt it, should, as we shall mention it in its place, come out entirely from the mould, you must not fail to place these sorts of vent pipes on all the rising and dist'nf parts from the mean bulk of the figure, such as the arms, fingers, draperies, &c. &c. from which the wax must be got out with facility, either by means of particular vent holes, so formed as to descend to the bottom of the figure, or by means of those large ones placed perpendicularly alongside of it.—Observe, always, to make the pouring holes which come to the face and hands the smallest of any, that they may not affect too much the features and likeness, if any be intended, of those parts; and that you may the more easily repair those places with the chisel, when they are finished.

14. After these various pipes have been thus carefully fixed all about the figure, you must so place them that two of the main perpendicular ones should join together at five or six inches higher, and above the upper part of it, and be terminated by a wax cup of four inches deep, and as much diameter, under, and at the bottom part of which you solder them. This cup serves as a funnel to receive the metal, and introduces it into the pouring holes, by means of its communication with them, to convey it afterwards into all the parts of the figure at once, and form it. Therefore, if there be four perpendicular ascending

pipes, you make two such cups, to communicate the metal to these pipes.

15. As for the vent holes, let them free above the top of the figure, and higher than the pouring ones, because they want no cups.

16. When the wax figure is thus completely repaired and garnished, with all its pouring and vent holes, you prepare a composition of putty, and crucibles powder, well grinded, and fisted very fine, which you dilute clear in a pan, like a colour for painting. With a brush take this composition, and cover all the figure, as well as the vent and pouring pipes. This operation you repeat several times, observing carefully to fill up all the cracks and crevices which may happen in drying. When the wax is thus perfectly covered every where, you put with the same brush, another composition thicker than the first, and of a stronger sort.

17. This composition is made of the same materials as the other, but with this addition, that you mix some free earth along with it, and horse-dung, quite clear from any straw. After having given six or seven coats of this, you give another coat again, much thicker still, of a stuff composed of nothing but free earth and horse-dung, and this being dry, you give half-a-dozen more of the same, allowing time between each to dry. At last, you put with your hand, and no more with the brush, two other coats of this same last composition, of free earth and horse-dung, mixed in form of mortar, observing always that the one should be perfectly dry, before laying on the other; and that there should be no part of the figure, whether naked or draperies, but what is equally covered with every one of the different coats we have mentioned.

18. Next to this, you must have flat iron bars turned and bent according to the disposition of the figure, which being fixed by means of hooks at the sides of the grate on which it stands, rise up as high as the pipes, and joining close to the mould, unite at top by means of a circle of iron which runs through all the hooks, by which these bars are terminated. Then you surround again the figure with

with other iron bars, made in form of hoops, to prevent the others which go from top to bottom, and to which they are fixed by means of wires, from giving way; and between every one of these bars, both perpendicular and horizontal, there must be no more than seven or eight inches distance allowed.

19. When all these bars are well fixed together, and enabled thereby to support and contain the mould, you take a compost of free earth, horse-dung and hair mixed together, in consistence of mortar, and with this you cover the mould and the bars all over, without attending any more to the shape of the figure, so that there appears no more but a shapeless lump of clay, which ought to be of about four or five inches thick.

20. When the mould is thus completed, you are to dig a square pit sufficiently deep for the top of the mould to be somewhat lower than the superfice of the ground where the pit is dug, and sufficiently wide also to allow room of a foot and a half, free all round the mould, when descended into it.—At the bottom of that pit, you construct a furnace, on the top of which there is to be a strong iron grate supported by the arches and wall of the furnace, which is to be made of stone or bricks, as well as the four sides of the pit from top to bottom.

21. After the grate is placed on the furnace, you descend the mould on it by means of engines. Then under the pipes which are to serve for pouring, as well as vent, you place pans to receive the wax which is to run off. This done, you light a middling fire to heat the figure, and all the place where it stands, with so moderate a heat, that the wax may melt without boiling, and come entirely out from the mould, without there remaining any part of it; which would not be the case if the heat be so great as to make it boil, for then it would stick to the mould, and cause defects in the figure, when you come to run the metal.—When therefore, you judge that all the wax is out, which you may know by weighing that you employed, and weighing it again after it is in the pans, you take these off, and stop the pipes, through which it came out, with clay. Then fill all the empty parts of the pit round the figure with

bricks, which you throw in gently, but without order; and when it is come up to the top, make a good brisk fire in the furnace. As the flame is interrupted by these bricks, it cannot ascend with violence, nor hurt the mould, and they only communicate their heat in going through all those bricks, which become so hot, that they and the mould are at last both red hot.

22. Twenty-four hours after the fire has been lighted, when you see that the bricks and the mould are equally red hot from top to bottom, you let the fire go out, and the mould cool, by taking all the bricks off. When there is no more heat at all, you throw some earth in the pit, to fill the place which had been occupied with the bricks; and in proportion as you throw it in, you tread it with your feet, and press it against the mould.

23. In order to melt the metal, you construct, just by the pit where the mould is, a furnace, the lower part of which ought to be higher by two or three inches than the top of the said pit, in order to obtain a sufficient declivity from it to the pit for the running of the metal. Its construction must be after the form of an oven, with good bricks and free earth, and supported by good and strong iron hoops. There is a border raised all round, so as to make it capable to contain all the metal which is intended to be melted in it. On the side which looks towards the pit, there is an opening, which is stopped during the melting of the metal, and from that opening comes an earthen funnel practised, which goes to a basin of good free earth placed over the mould, and the middle of which corresponds and communicates to those cups we have mentioned before. (No. 14.) This basin is called by the workmen *escheno*. And in order to prevent the metal from running into these cups, before the whole which is in the furnace is run into the *escheno*, there are men on purpose who hold a long iron rod terminated by one end in the form of these cups, and stop them.

24. When the metal is melted, you unstop the opening of the furnace in which it is contained; this runs into the *escheno*, and as soon as it is arrived, the men take off the rod with which they stopped the cups, and the mould being

being instantly filled all over, the figure is formed in one moment.

25. After the mould is thus filled with the metal, you let it stay in that situation for three or four days, then at leisure, you take off the earth which had been thrown all round it, which helps the mould to become entirely cold. As soon as you are sure there is no more heat, you break the mould, and the metal figure appears surrounded with rods of the same metal, starting out from it, occasioned by the vent and pouring holes, or pipes, through which the metal was introduced, and which remained filled with it. These you must saw off, in order to unburden the figure of so much, and get it out of the pit more easily. Then you clean and scour with water and grinding-stone in powder, and pieces of deal or other sort of soft wood, and you search in all the hollow places of the draperies and other parts.

26. When the figures are small, they are generally washed with aquafortis; and when it has operated, you may wash them again with common water. When they are thus well cleansed, you repair, finish, and fault those which require to be treated more highly than others; for the large ones are seldom searched so minutely.

27. After they have been as much finished as they are intended to be, you may give them, if you like, a colour, as some do, with oil and blood stone. Or, as some others practise it, you may make them turn green by means of vinegar. But without all that trouble, the bronze will in time take a natural varnish of itself, and becomes of a blackish hue.

III. *How to gild such sorts of figures.*

1. They may be gilt two different ways; either with gold in shells, or with gold in leaves. The first method is the handsomest, and at the same time the most lasting, it being always used for small sized works. To apply it, you make a mixture of one part of the best gold, and seven of mercury, which founders call silver in that sort of process. When these are incorporated together, you then heat the figure, and rub it with the composition, which whitens

whitens it, and heating it again over the fire, the mercury exhalles, and the figure remains gilt.

2. As for the other method, it is only for large sized works, and them on which one is not willing to make a great expence; you scrape the figure with small files, and other proper tools, make it quick and clean, then you heat and lay on a gold leaf, repeating this four times.

IV. Of the choice and composition of metals.

Any metal whatever may be used for the casting of figures, though the general composition runs as follows.

1. For the fine bronze figures, the alloy is half brass, half copper. The Egyprians, who are said to be the inventors of that art, used to employ two thirds of brass against one of copper.

2. Brass is made with copper and calamine. One hundred weight of calamine renders one hundred *per cent.* Calamine is a stone from which a yellow dye is drawn. It is to be found in France and at Leige.

3. Good copper ought to be beaten, not molten, when intended for statues. You must guard also against using putty, when in alloy with lead.

4. Copper may be forged either hot or cold. But brass breaks when cold, and suffers the hammer only when hot.

5. There is a sort of metallic stone called zinc, which comes from Egypt; it renders the copper of a much finer yellow than the calamine; but as it is both dearer and scarcer, they are not so ready to use it.

6. As for the composition for making of bells, it is twenty pounds weight of pewter for each hundred of copper. And the artillery pieces take but ten pounds only of pewter to one hundred of the other. This last composition is not good for the casting of figures, as it is both too hard and too brittle.

C H A P. X.

SECRETS relative to the making of curious
and useful Sorts of INK.I. *A good shining ink.*

1. **PUT** four quarts of warm water in a glazed pipkin. Add eight ounces of turpentine oil, and one pound of gall-nuts bruised in a mortar. Let the whole infuse thus for a week, then boil it gently, till with a pen you may draw a stroke yellow and shiny with it. Strain it through a strong cloth. Set it on a blasting fire, and as soon as it boils, add seven ounces of green vitriol to it, keep stirring it with a stick till it is perfectly dissolved. Let this rest for two days without disturbing it. There will be a skim on the top, which must be thrown off. Decant next the clearest part into another vessel, which you set on a gentle fire to evaporate about two fingers of the liquor, then let it rest four or five days, and it will be fit for use.
2. Rain water, or that in which walnuts have been infused, are both very good for making of ink.
3. With white wine, or old beer, you may likewise make very good shining ink.
4. A carp's gall is very proper to mix among it.

II. *To write on grease, and make the ink run on it.*

1. Cut a bullock's gall open into a pan, and put a handful of salt and about a quarter of a pint of vinegar to it, which you stir and mix well. Thus you may keep the gall for twelve months, without its corrupting.
2. When

2. When you are writing, and you find your paper or parchment greasy, put a drop of that gall among your ink in the ink-horn, and you will find no more difficulty to make your pen mark.

III. An ink-stone, with which ink-stands may be made, and with which you may write without ink.

Take gum arabic, fourteen ounces; lamp black, thirteen; and burnt willow wood coals, three. Pound the gum into an impalpable powder, and dissolve it into a pint of common water. This done, knead your above-mentioned powders with part of this gum water, so as to make a paste or dough of them, as it were for bread. With this dough form ink stands of the shape and form you like best, and in these ink stands, while the composition is still soft, you may stamp a few small holes.

2. This done, dry these stands in an ardent furnace for four hours, or in the shade, a sufficient time. When dry, brush them over with your aforementioned gum water, till they appear as black and shiny as jet, and as hard as marble.

3. When you want to use them, put a few drops of water in one of the holes, and put a pen to soak in it at the same time. If the water be but just put in, the ink will not be quite so black, but if it have remained a little while, it will be as black as the blackest of any inks.

IV. To write with common clear water.

Take gall nut powder, and vitriol calcined in the sun to whiteness, of each four ounces, and sandarak one and a half. All being pulverised and mixed, rub your paper with that powder; then sleeping your pen in any common water, and writing with it, it will appear black like any other ink.

V. A good ink both for drawing and writing.

1. Bruise with a hammer one pound of gall nuts, and put it in to infuse for a fortnight in the sun, in two quarts of clear water, stirring it now and then. Strain this infusion through a sieve or a cloth in a glazed pipkin.

2. In

2. In another vessel put two ounces of gum arabic, and half of the above infusion. In the other half which remains to dissolve two ounces and a half of German green vitriol, and let it infuse for four and twenty hours. Join afterwards both infusions together; and a week afterwards, or thereabouts, the ink will be very good, and fit for use.

VI. To make very good ink without gall nuts; which will be equally good to wash drawings and plans, and strike very neat lines with the pen.

1. In half a pound of honey put one yolk of an egg, and beat it a good while with a flat stick. Then asperse the matter over with three drachms of gum arabic in subtile powder. Let this stay about three days, during which, beat it often with a stick of walnut-tree wood.

2. Next to this, put to it such a quantity of lamp-black as will make it in consistence of a dough, which you make in cakes, and dry in the air, to render it portable.

3. When you want to use it, dilute it with water, or with a lye made either of vine wood ashes, or walnut-tree, or oak, or even peach stones.

VII. An invisible ink.

1. Dissolve one ounce of ammoniac salt in a glass tumbler of water, and write. When you wish to make the writing appear, hold the paper to the fire, and it will become black.

2. The same may be done with the juice of an onion.

VIII. Another way.

Dissolve some alum, and write with the liquor. Steep the paper in water, and the writing will appear white.

IX. To make good India ink.

Burn some lamp-black in a crucible till the fume which arises in doing it, has entirely subsided; grind it next on porphyry,

porphyry, or marble, with a pretty strong water of gum tragacanth. Add an equal quantity of indigo burnt, and grinded in the same manner. Then mix them both together on the stone, and grind them for two hours. Gather up the composition, in a flat square, of the height and thickness you are willing to give to your sticks. Cut these with a knife to your intended size, and put them, if you chuse, into an iron mould; and let the paste should stick to them, rub the inside of the mould with lamp or ivory black, or with peach stones dust, which you burn in a crucible stifled with a brick to stop it well.

X. Red ink.

Dissolve half an ounce of gum arabic in three ounces of rose water. Then with this water, dilute cinnabar, vermillion, or minium.

Ink of any colour may be made in the same manner, by substituting only a proper colouring ingredient to the aforementioned cinnabar, &c.

XI. A green ink.

Grind together verdigrease, saffron, rue juice, then dilute this paste in the abovementioned gum rose water.

XII. To make an ink which appears and disappears alternately.

Write with an infusion of gall nuts filtered through brown paper, and the writing will not be visible. When you want to make it appear, steep a little sponge, or bit of cotton, into an infusion of vitriol, and pass it over the written place of the paper; the writing will immediately appear. To rub it off, and make the paper look all white again, do the same with spirit of vitriol, and all the writing will be gone. To make it visible again, rub the paper over with oil of tartar; and thus continue for ever.

XIII. The

XIII. *The invisible method of conveying secrets.*

1st. Ink.

Infuse for twenty-four hours, half an ounce of gold litharge in half a pint of distilled white wine vinegar, and shake the bottle often during the first twelve hours of the infusion. When all is well settled, decant the clear part into another phial, which you must stop carefully, and throw the fæces away.

If you have any secret to communicate to a friend, write it with this liquor, and it will be no more visible than if you wrote it with clear pump water.

XIV. *An ink to write over the other.* 2d. Ink.

Over the secret, written with the first invisible ink, you write any indifferent matter with the following composition.

Burn some corks in the fire; and when they are so thoroughly burnt as to blaze no more, put them into a bason, and soak them with brandy; then grind them into a paste, which, when you want to use, you dilute with distilled water, till it is fit to write with like any other ink.

XV. *Another ink which effaces the second, and makes the first appear.* 3d. Ink.

Dilute rose water and sorrel juice separately. Put half a pint of each together in a bottle, with two ounces of quick lime, and one of auripigment. Stir this well, now and then, and let it infuse during twenty-four hours, as you did the first. Decant the clear part, and throw the grounds away.

When you want to find out what was written with the first invisible ink, and which lies concealed under the second black one, steep a sponge into this present liquor, and passing quickly over every line; what was written in black vanishes at one stroke, and what was invisible appears in its stead as black, and as much effaceable as if written with common ink.

XVI. *An*

XVI. *An ink which will go off in six days.*

Write with willow-wood cinders, pulverised and diluted with common water.

XVII. *Another which you may rub off when you please.*

Dilute gunpowder in common water, and write with it on a piece of parchment; then when you want to efface it, take your handkerchief, and rub it off.

XVIII. *Powder ink.*

Take equal parts of black rosin, burnt peach, or apricot stones, vitriol and gall nuts, and two of gum arabic. Put the whole in powder, or in cake, as you like best.

XIX. *An exceeding good writing ink.*

1. Boil half a pound of India wood shavings in two quarts of good vinegar, to the reduction of one half. Take off the shavings, and substitute four ounces of gall-nuts bruised, and put all into a strong bottle, which you expose in the sun for three or four days, shaking it during that time three or four times a day. Then add a dissolution of two ounces and a half of gum arabic in half a pint of either water or vinegar. Let the whole stand again in the sun for a week, shaking it several times every day, during that term; strain the liquor afterwards, and keep it for use.

2. If you should want to render this ink shiny, you must dissolve both the vitriol and gum arabic in an infusion of India wood, made as before directed, with the addition of one handful of pomgranate rinds in the bottle wherein the gall nut is.

3. If instead of setting this composition in the sun, you should boil it, it will take but a quarter of an hour a-doing. But it is never so good, and besides, always turns muddy.

XX. *A gold colour ink, without gold.*

Put half a drachm of saffron, one of auri-pigment, and one she-goat's, or five or six jack galls, in a glass bottle; and set it for a fortnight in hot horse dung. At the end of that term, add a gill of gum water, and place it again for the same length of time in horse dung. Then it is fit for use.

XXI. *Another way.*

Palverise into an impalpable powder one ounce of orpine, and as much chrystal. Put this powder in five or six whites of eggs beaten, then turned into water. Mix all well, and it will be fit either to write or to paint in gold colour.

XXII. *To write in silver without silver.*

Mix so well one ounce of the finest pewter and two of quicksilver together, that both become quite fluid. Then grind it on porphyry with gum water, and write with it. All the writing will look then as if done with silver.

XXIII. *A good shining ink.*

Infuse for a day in a quart of good table beer half a pound of the blackest and most shiny gall nuts you can find. Add three ounces of gum arabic and half an ounce of brown sugar candy, with four ounces of green copperas. Then boil the whole in a glazed pipkin for about one hour, strain it through a cloth, and put it in the cellar to keep it for use.

XXIV. *A blue ink.*

Dilute half a pound of indigo with some flake white and sugar, in a sufficient quantity of gum water.

The same may be done with ultramarine, and gum water.

XXV. *A*

XXV. *A yellow ink.*

Dilute in gum water some saffron, or French berries, or gamboge, and you will have a yellow ink. The same may be done with any other colouring ingredient, to obtain an ink of the colour one likes to have.

XXVI. *A green ink, which may keep two years.*

Put a pint of water on the fire in a varnished pipkin; and when it is ready to boil, throw in two ounces of verdigrease pounded, and boil it gently on a slow fire for the space of half an hour, stirring it often during that time with a wooden spatula. Then add one ounce of white tartar, well pulverised, and boil it one quarter of an hour. Strain two or three times through a cloth, then set it before the fire to evaporate part of it, in order to make it more shiny. But observe, that the more it boils, the more it loses of its green colour, and approaches to the blue.

XXVII. *A shining ink.*

Put in a clean brass caldron six quarts of white wine, or beer, or rain water, with one pound of gall-nuts, and two ounces of roch-alum in powder, which you boil all together, to the reduction of one half. Take this liquor off from the fire, and strain it through a cloth into a glazed pipkin, and set it on the fire again for two hours longer. Then for the three or four following days, observe to stir it well only with a little stick, without boiling it at all; it will be fit for use. Whenever you use it, it will be very pale, but in twenty-four hours after, it will be as black as jet.

XXVIII. *A way of writing which will not be visible, unless you hold the paper to the sun, or to the light of a candle.*

Take flake white, or any other whitening, and dilute it in a water impregnated with gum adragant. If you write with this liquor, the writing will not be perceptible,

able, unless you apply the paper to the sun, or the light of a candle. The reason why it is so, is, that the rays of light will not find the same facility to pass through the letters formed with this liquor, as through the other parts of the paper.

XXIX. *A secret to revive old writings, which are almost defaced.*

Boil gall-nuts into wine; then steeping a sponge into that liquor, and passing it on the lines of the old writing, all the letters which were almost undecypherable will appear as fresh as newly done.

XXX. *To write in gold or silver letters.*

Take gold or silver in shells, and dilute it with some gum arabic water. Then dip either a pen or a pencil in it, and write.

XXXI. *An iris on white paper.*

Boil in a new iron pot any quantity of sublimate with common water, and a handful of small nails. When the mercury begins to revivify, which happens after two or three hours boiling, throw the whole in a pan of cold water, half filled, and place it uncovered for one night, in a bog-house. Then the colours will swim on the top. Observe that the pan must be perforated at the lowest part on one side, and stopped with a cork, or any other common thing; and that a sheet of white paper must have been placed at the bottom of it, previous to the half filling it with the cold water, in which you are directed to throw the boiling composition. After this has been left in the bog-house the space of one night, and the colours do swim on the top, unstop the whole; and let the pan empty itself. Then the colours will settle, and fix themselves on the sheet of paper; and when this begins to dry, take it quite out of the pan, to finish drying it in the shade.

XXXII. *A*

XXXII. *A shining ink.*

1. In a quart of rain water settled, filtered and purified, infuse for four or five hours, on a slow fire, one pound of gall-nuts, chusing the smallest and blackest. Let them be previously bruised in a mortar, with some pomegranate rinds, and raspings of fig-tree wood. Next to this make a lye of six ounces of Roman vitriol, and boil it in the space of one hour at least, stirring it with a stick of fig-tree wood; then let it rest twelve hours, and sift it.

2. On the same ground you may add the same quantity of water, and let it infuse three days; then boil it, as above directed, with new copperas.

XXXIII. *A common ink.*

1. Bruise six ounces of gall-nuts, and as much gum arabic, and nine of green vitriol. Put them afterwards in three quarts at least of river, spring or rain water. Stir the composition three or four times a day. And after seven days infusion, strain all through a cloth, your ink is made.

2. This ground, as well as that above, will admit of fresh water being put to it, with an addition of vitriol also.

XXXIV. *How to prepare printers ink.*

1. Take one pound of common turpentine, made with the sandarak of the ancients, which is nothing else but juniper and lintseed oil. Add to it one ounce of rosin black, which is the smoke of it, and a sufficient quantity of oil of nuts.

2. Set this composition on the fire, and boil it to a good consistence. Such is the whole secret. Observe however, that in the summer it must boil a little more, and a little less in the winter. For in the summer the ink must be thicker, and thinner in the winter; because the heat makes it more fluid. In which case it is therefore proper to boil it a little more, or to diminish the quantity of oil, allowed in the proportion to that of the turpentine.

XXXV. *The*

XXXV. *The preparation of the ink which serves to write inscriptions, epitaphs, &c. on stones, marbles, &c.*

This ink is made with nothing else but a mixture of lintseed oil black, and black pitch dissolved over a small fire. They call this also *stucco*.

XXXVI. *The various ways of making an ink for writing.*
1st. Method.

Put three ounces of gall-nuts, bruised on a stone, in thirty ounces of warm rain water. Let this be exposed in the sun for two days, after which time add two ounces of the finest green vitriol reduced into a subtile powder, and stir the liquor with a fig-tree stick. Let then the whole be exposed for two days longer in the sun again. Then put one ounce of gum-arabic, or cherry-tree gum, and set it in the sun again for one day, after which boil it one bubble, and strain it directly through a cloth. If too thick, add some water to it; if too thin, gum-arabic.

XXXVII. *Another way.* 2d. Method.

1. Take one pound of gall-nuts, and half a pound of gum-arabic, and as much of *ligustrum* berries. Infuse this, for a week, in three quarts of common water; then, by boiling, evaporise one quart of it or thereabouts. Then take it off from the fire, just boiling hot as it is, and throw in one pound of vitriol; stir well, and let it thus stand for a week or ten days. Strain it afterwards, and you will have a very fine ink.

2. You may add to this some pomegranate rinds, either whole, or bruised, but by no means in powder. Should it grow too thick, a little male chamber lye, vinegar, or rose water, will thin it and give it a proper fluidity.

XXXVIII. *Another way.* 3d. Method.

Infuse pomegranate rinds in well water, boil it to the diminution of one third. Then to every one pound of this infusion add two ounces of green vitriol, and half an

ounce of gum-arabic in powder. Incorporate all on the fire, then you may strain it, and keep it for use.

XXXIX. *Another way.* 4th. Method.

1. Some people have a very cheap way of making ink, with the liquor with which the curriers wash their leather, to blacken it. To that liquor they only add a little vitriol and gum-arabic, and boil the whole one minute.
2. The currier's dye for leather is made with common or rain water, in which they boil those little cups which carry the acorn on the oak tree.

XL. *Another way.* 5th. Method.

1. Bruise on a stone, some gall-nuts, and roast them in an iron pan with a little olive oil. Put one pound of such gall-nuts, thus prepared, in a glazed pipkin. Pour over it white wine, so as to cover the gall-nuts over by four fingers breadth; then add half a pound of gum-arabic, and eight ounces of vitriol, both in powder. Set the whole in the sun for some days, stirring often the composition with a stick, after which, boil it for a few minutes on a slow fire, then strain and keep it.
2. On the fæces you may put again the same quantity as above of white-wine, boil and strain it; and repeat it as long as the wine gets any tincture from the grounds.

XLI. *Another way.* 6th. Method.

There is again another very good method of making ink, which is this. In twenty ounces of white wine infuse three of bruised gall-nuts; and, in thirteen other ounces of similar white wine, dissolve half a one of gum-arabic. Every day for a whole week, never fail to give several stirrings to the infusion of gall-nuts, then strain it, and add the dissolution of gum, and mix with all two ounces of Roman vitriol. Now and then give a shake or two the bottle, and guard from letting it approach either the fire or the sun. This composition will prove a very good ink.

XLII. *Another way.* 7th. Method.

Take three ounces of gall-nuts; new elm, or wild-ash bark, and pomegranate dry rinds, equal quantities. Infuse all in thirty ounces of white wine exposed for six days in the sun, and stir it seven times a day. Then add two ounces of gum-arabic, and one of Roman vitriol, which infuse four days before straining, and the ink is done.

XLIII. *Another way.* 8th. Method.

Take three ounces of gall-nuts, a handful of ash-tree bark, two pounds and a half (or three pints) of white-wine, and mix all over a slow fire. When it begins to boil, take it off, and strain it. Replace it on the fire till it begins to boil again; then take it off, and add two ounces of gum-arabic, and as much Roman vitriol. Stir with a stick for half an hour, then let it rest for four days, taking great care that your liquor be well covered; then strain it again, and keep it for use.

XLIV. *Another way.* 9th. Method.

Put in four pounds, or two quarts, of white wine, a glass of the best vinegar, and two ounces of bruised gall-nuts. Let this infuse thus for four days, then boil away and evaporise one fourth part of it. Strain it, and add two ounces of gum-arabic in powder; mix well, and boil it for the space of five minutes. Take it off from the fire, and add again three ounces of Roman vitriol, stirring it well till all is quite cold. Put it then into a glass bottle well stopped, and expose it for three days in the sun. Then strain the ink, when it will be fit for use.

XLV. *An ink which may be made instantly.*

Take gum arabic, and vitriol, of each one ounce; bruised gall-nuts one and a half. Put all in ten ounces of white wine or vinegar; and, no longer than one hour after, you may use it.

XLVI. *Another way to the same purpose.*

Put in about eight ounces of the best white wine, half

an ounce of gall-nuts, as much gum-arabic, and eight drachms of Roman vitriol. Warm it a little on the fire, and the ink will instantly be done.

XLVII. A portable ink, without either gall-nut or vitriol.

1. Take one pound of honey, and two yolks of raw eggs. Dilute and mix them all well with the honey. Add three drachms of gum arabic in subtile powder. Stir well the whole together during three days, and several times a day, with a fig-tree stick flattened at one of the ends. Then, to that first composition add again as much of that sort of lamp-black which is used in printers ink (see art. xxxiv. in this chap.) as may be required to thicken the whole into a lump, which you let dry, and keep in that state.

2. When you want to use it, take a bit of it and dilute it in any common water, or lye, and it will write like any other ink.

XLVIII. Another portable ink, in powder.

This is made with equal quantities of gall-nuts and vitriol; a little gum-arabic and still less of sandarak of the antients. You pound, or grind each drug well, and mix the powders together, which are to be very fine. Lay some of this compound powder on your paper, and spread it well with your fingers. Then dipping your pen into clear water you may write on this prepared paper, and it will appear as black as any other ink.

XLIX. Another portable powder, to make ink instantly.

Take and reduce into subtile powder ten ounces of gall-nuts, three of Roman vitriol, otherwise green copperas; with two ounces of roch-alum and as much of gum-arabic. Now when you want to make ink, put a little of this mixture into a glafs of white wine, and it will instantly blacken, and be fit for use.

L. Another sort of powder to the same purpose.

1. There is another method, by no means inferior to the

the others preceding, to make a powder fit for travellers, nay, which has the quality of mending any pale common ink, by giving it instantly a degree of consistence, blackness, lustre, and beauty, which it wanted before. To use this powder, you only dissolve it in any liquor you like; such as water, whether soft or salt, in wine or vinegar. Whether warm or cold, it does not signify much, though the warm is somewhat preferable. This curious powder is made as follows.

2. Take peach stones with their kernels in, put them in the fire till perfectly reduced into coals. Then take them off, and when they are quite dead and black, mix part of them with some lamp black. Add two parts of bruised gall-nuts fried in oil and dried up: four parts of gum-arabic, all pulverised impalpably, and sifted through a fine sieve.

3. *Observation.* There is nothing which dyes so fine a black. It is also good for the human body; for, taken internally, it dissipates all obstructions, and promotes urine.

LI. *A yellow ink.*

Grind, on the same stone, some dry saffron, and an equal quantity of the finest orpine you can find, with carp's or jack's gall. Put all into a bottle, which you must stop well and place for some days in hot horse dung. When you take it out you will find a fine gold colour ink.

Note. When the opportunity may be had, it is preferable to employ the juice extracted from fresh saffron flowers, that is to say, from the picked stamens of that flower.

LII. *Another way.*

Some take the yellow superficies of orange peels, and very pure flour of brimstone, mixing all upon the stone, then put it in a glass bottle, which they set in the damp for ten days. Before using this it requires to be warmed, and the letters which are traced with it are not of a bad yellow.

LIII. *Another way.*

Chase the finest orpine, of a beautiful gold colour, shiny, shelly, and perfectly freed and purified of all its earthy particles. Mix it with an equal quantity of crystal perfectly grinded, and whites of eggs in a sufficient quantity to make it so liquid as to admit of writing, drawing, and painting with it.

LIV. *Another sort of yellow liquor.*

A certain golden distilled water may be made, with which gold letters could be traced. The process is as follows. Put some orpine reduced into impalpable powder in rosemary water, drawn by distillation. Then distil it again, and the liquor which comes from it will be fit to write in gold letters.

LV. *Another way.*

1. Take two ounces of pewter, and melt it in a crucible. When melted add one of quicksilver, and mix it well with the pewter. Then put all on the stone, and grind it with one ounce of sulphur. This composition will produce a very fine yellow powder.

2. To use it, dissolve only what quantity you want in the white of an egg; and, whatever you trace with it will appear of a very good gold colour.

LVI. *Another way superior to all the rest.*

Of all the receipts which may be given for this purpose, none approaches the purpurine powder. Except gold itself, nothing can imitate it nearer; therefore this is the most esteemed. True it is, it does not stand the injuries of the weather so well as real gold, nor lasts so long.—This powder is made with equal parts of pewter and quicksilver, or equal parts of ammoniac salt and sulphur. And, to preserve it, you keep it in little leathern bags.

LVII. *Of the use of sugar-candy in ink.*

Sugar-candy has the admirable virtue of restoring bad ink

ink into good. It blackens it, renders it shiny, and makes it run properly. Therefore it is most advisable to put some powder of white sugar candy into the bottle or the ink-horn.

LVIII. *A sort of black ink fit for painting figures, and to write upon stuffs, and linen, as well as on paper.*

Bruise on the stone one ounce of gall-nuts, and put it in a pint of strong white-wine vinegar on the fire, with two ounces of iron filings. Evaporate away about one half of the liquor in boiling it gently, strain the remainder, and keep it for use.

It would not be improper to add a little gum-arabic, to the above composition; however, it may as well be let alone.

LIX. *To prevent ink from freezing in the winter.*

If instead of water, you make use of brandy with the same ingredients which enter into the composition of any ink, that ink never will freeze. You may also put some into the ink already made otherwise, and it will assist a good deal in preventing the frost from acting upon it.

LX. *How to renew old writings almost defaced.*

We ordered, art. xxix. of this chapter, to boil gall-nuts in wine: but we must add here that it is far preferable to infuse them only twenty-four hours in it, then put all into a retort and distil. The liquor which comes from it being passed on the paper or parchment, will revive the defaced parts of the writings.

LXI. *A green ink.*

Take fine verdigrease, and dilute it with a mixture of distilled water of green gall-nuts and vinegar. Form it into drops such as those of confectioners. Dry them, and when you want to use them, dilute them into gum-arabic water.

LXII. *Another way.*

Take the strongest white-wine vinegar, in which dissolve verdigrease, rue-juice, and a little roch-alum.

LXIII. *To write in gold letters, on iron or steel.*

1. Pound some gold marcasites in a mortar; put it to infuse twenty-four hours in vinegar, and boil it gently over the fire in a glazed pipkin, till the vinegar is almost vanished away, which will take you nearly a whole day's time to boil. Then take the composition off from the fire, and after having left it to cool and dry a little more in the shade, put it in a retort, and distil.

2. With this liquor, write on iron or steel; the letters will appear black at first: but if, when dry, you rub over them with a piece of linen, they will turn gold colour.

LXIV. *An ink which writes like silver, without silver in it.*

1. Amalgamate equal parts of pewter and quicksilver, in the same manner as goldsmiths do; grind well that amalgamation on the stone.

2. If you dilute of this powder in gum-arabic water, and write with it, your letters will appear like silver.

LXV. *To write on silver in black which will never go off.*

Take burnt lead, and pulverise it. Incorporate it next with sulphur and vinegar, to the consistence of a painting colour, and write with it on any silver plate. Let it dry, then present it to the fire so as to heat a little the work, and all is done.

C H A P. XI.

SECRETS Relative to WINE.

I. *To make a wine to have the taste and flavour of French muscat.*

YOU have only to put in the cask a little bag of alder flowers when the wine is just done pressing, and while it boils still. Then, a fortnight after, take out the bag.

II. *To make the vin-doux.*

When you cask the wine, put in at the bottom of the cask half a pound of mustard seed, or a pound, if the cask be double the common size.

III. *To make vin-bourru, of an excellent taste.*

Take two quarts of wheat, which boil in two quarts of water till it is perfectly bursted. Stir it well, then strain it through a fine cloth, squeezing a little the whole to get the creamy part out. Put two quarts of this liquor in a hogshead of white wine, while it is still a-boiling or in fermentation, with the addition of a little bag of dried alder flowers.

IV. *To imitate a malvoisie.*

Take of the best galangal cloves and ginger, each one drachm. Bruise them coarsely, and infuse for twenty-four hours, with brandy, in a well closed vessel. Then take these drugs out, and having tied them in a linen bag,

Let them hang in the cask by the bung-hole. Three or four days after, your wine will taste as good and as strong as natural malvoisie.

V. To change red wine into white, and white into red.

If you want to make red your white wine, throw into the cask a bag of black vine-wood ashes; and to whiten the red wine, you must put a bag of white vine-wood ashes. Forty days after, take out the bag, shake the cask, and let it settle again; then you will see the effect.

VI. To prevent wine from fusing, otherwise tasting of the cask, and to give it both a taste and flavour quite agreeable.

Stick a lemon with cloves as thick as it can hold; hang it by the bung hole in a bag over the wine in the cask for three or four days, and stop it very carefully for fear of its turning dead, if it should get air.

VII. To make a wine produce a sweet wine.

One month before gathering the grapes, you must twist such branches as are loaded with them, so as to interrupt the circulation of the sap: then strip the leaves off entirely, that the sun may act with all its power on the grains, and, by dissipating their superfluous moisture, procure a sweetness to the liquor contained in them when they come to be pressed.

VIII. To make a sweet wine of a very agreeable flavour, and besides very wholesome.

Gather the grapes, and expose them for three whole days in the sun. On the fourth day at noon put them under the press, and receive the first drop which runs of itself before pressing. When this virgin drop shall have boiled, or fermented, put to every fifty quarts of it one ounce of Florentine orrice in subtile powder. A few days after take it out clear from its lye, and then bottle it.

IX. To clarify in two days new wine when muddy.

Take a discretionable quantity of fine and thin beech shavings,

shavings, which put into a bag, and hang by the bung hole, in the cask. Two days after, take out the bag; and if from red you want to make it white, you may do it by putting in the cask a quart of very clear whey.

X. *To make the wine keep mout or unfermented for twelve months.*

Take the first, or virgin wine, which runs of itself from the grapes before pressing; cask and stop it well, then smear the cask all over with tar, so that the water could not penetrate through any part of the wood into the wine. Plunge these casks into a pond deep enough to cover them entirely with water, and leave them there for forty days. After which term you may take them out, and the wine contained in them will keep new for twelve months.

XI. *To make a wine turn black.*

Place in the cellar, wherein the wine is a-fermenting, two pewter pots, and it will turn black.

XII. *To clarify a wine which is turned.*

Take clean roch-alum in powder, half a pound; sugar of roses, as much; honey, whether skimmed or not, eight pounds, and a quart of good wine. Mix all well, and put it in a cask of wine, stirring all as you pour it in. Take the bung off till the next day, then put it on again. Two or three days after this, it will be quite clear.

XIII. *To correct a bad flavour in wine.*

Put in a bag a handful of garden parsley, and let it hang by the bung-hole in the cask, for one week at least. Then take it out.

XIV. *To prevent wine from spoiling and turning.*

Mix in the cask a tenth part of brandy, or half an ounce of oil of sulphur.

XV. *To prevent thunder and lightening from hurting wine.*

Put on the bung a handful of steel filings and another of salt, tied up in a bag.

XVI. To prevent wine from corrupting.

Put to infuse in the cask a handful of gentian-root tied in a bag.

XVII. To restore a wine turned sour or sharp.

Fill a bag with leek-seed, or of leaves and twisters of vine, and put either of them to infuse in the cask.

XVIII. To restore a wine corrupted and glairy.

Put in the wine cow's milk a little saltish; or else the rinds and shells of almonds tied up in a bag: or again, pine kernels.

XIX. To prevent wine from growing sour, and turning into vinegar.

Hang by the bung hole, in the cask, a piece of bacon, of about one pound and a half, and replace the bung. Or else throw into the wine a little bagful of ashes of virgin vine.

XX. To make a new wine taste as an old wine.

Take one ounce of melilot, and three of each of the following drugs, viz. liquorice and celtick hard, with two of hepatic aloes; grind and mix all well together, put it in a bag, and hang it in the wine.

XXI. To restore a wine turned.

Draw a pailful of it; or, take the same quantity of another good sort, which boil, and throw boiling hot over that which is spoiled and flinking; then stop the cask quickly with its bung. A fortnight after taste it, and you will find it as good as ever it was, or can be.

XXII. To restore a wine fusted, or tasting of the cask.

Draw that wine intirely out of its own lye, and put it in another cask over a good lye. Then, through the bung hole, hang up a bag with four ounces of laurel berries

berries in powder, and a sufficient quantity of steel filings at the bottom of the bag, to prevent its swimming on the top of the wine. And, in proportion as you draw a certain quantity of liquor, let down the bag.

XXIII. *To prevent wine from pricking.*

Put in the cask half a pound of spirit of tartar. Or, else, when the wine is still new and *mout*, throw in two ounces of common alum for every hogshead.

XXIV. *To make wine keep.*

Extract the salt from the best vine branches; and of this put three ounces in every hogshead at Martinmas, when the casks are bunged up.

XXV. *To clarify wine easily.*

Put in the cask two quarts of boiling milk, after having well skimmed it.

XXVI. *To prevent wine from turning.*

Put in the cask one pound of hare's shot.

XXVII. *To correct a musty taste in wine.*

Knead a dough of the best wheat-flour, and make it in the form of a rolling pin, or a short thick stick. Half bake it in the oven, and stick it all over with cloves. Replace it in the oven to finish baking it quite. Suspend it in the cask over the wine without touching it, and let it remain there; or else let it plunge in the wine for a few days, and take it quite out afterwards. It will correct any bad flavour the wine might have acquired.

XXVIII. *Another method.*

Take very ripe medlars, and open them in four quarters, without parting them asunder. Then tie them with a thread, and fix them to the bung, so that by putting it in again they may hang and soak in the wine. One month

month afterwards take them out, and they will carry off all the bad taste of the wine.

XXIX. *To correct a sour, or bitter taste in wine.*

Boil a quarter of barley in four quarts of water, to the reduction of two. Strain what remains through a cloth, and pour it in the cask, stirring all together with a stick, without touching the lye.

XXX. *To restore a spoiled wine.*

Change the wine from its own lye, upon that of good wine. Pulverise three or four nutmegs, and as many dry orange peels, and throw them in. Stop well the bung, and let it ferment one fortnight. After that term is over, you will find it better than ever. This method has gone through many experiments.

XXXI. *To sweeten a tart wine.*

Put in a hogshead of such a wine, a quarter of a pint of good wine vinegar, saturated with litharge; and it will soon lose its tartness.

XXXII. *Another way.*

Boil a quantity of honey in order to get all the waxy part out of it, and strain it through a double cloth. Of such a honey thus prepared put two quarts to half a hogshead of tart wine, and it will render it perfectly agreeable. If in the summer, and there be any danger of its turning, throw in a stone of quick lime.

XXXIII. *To prevent tartness in wine.*

Take, in the month of March, two basinfuls of river sand; and, after having dried it in the sun, or in the oven, throw it in the cask.

XXXIV. *To heighten a wine in liquor, and give it an agreeable flavour.*

Take two dozen or thereabouts of myrtle berries, very ripe.

ripe. Bruise them coarsely, after having dried them perfectly, and put them in a bag, which suspend in the middle of the cask. Then stop this well with its bung. A fortnight afterwards take off the bag, and you will have a very agreeable wine.

XXXV. *To give wine a most agreeable flavour.*

Take a pailful of *mout*, which boil and evaporate to the consistence of honey. Then mix with it one ounce of Florentine orrice, cut in small bits, and one drachm of *cassus*. Put all into a bag, and let it down in the cask by the bung-hole, after having previously drawn out a sufficient quantity of wine to prevent the bag from coming at it. This bag being thus suspended by a string, which will hang out of the bung-hole, stop it well, and there will drop from the bag into the wine a liquor which will give it a most agreeable taste.

XXXVI. *How to find out whether or not there be water mixed in a cask of wine.*

Throw in the cask one wild pear or apple. If either of these two fruits swim, it is a proof there is no water in the wine; for, if there be any, it will sink.

XXXVII. *To separate the water from wine.*

Put into the cask a wick of cotton, which should soak in the wine by one end, and come out of the cask at the bung hole by the other; and every drop of water which may happen to be mixed with the wine, will still out by that wick or filter.

You may again put some of this wine into a cup made of ivy wood; and then the water will perspire through the pores of the cup, and the wine remain.

XXXVIII. *To ungrease wine in less than twenty-four hours.*

Take common salt, gum arabic, and vine brush ashes, of each half an ounce. Tie all in a bag, and fix it to a hazel tree stick; then by the bung hole stir well the wine for one quarter of an hour, after which take it out, and

and stop the cask. The next day the wine will be as found as ever.

XXXIX. *To restore a wine.*

Put in the cask one pound of Paris plaster. Then make a piece of steel red hot in the fire ; and, by means of a wire fixed to one of its ends, introduce it by the bung-hole into the wine. Repeat this operation for five or six days running, as many times each day. Then, finally, throw into the wine a stick of brimstone tied in a bag, which you take off two days after ; and the wine will be perfectly well restored.

XL. *To correct a bad taste and sourness in wine.*

Put in a bag a root of wild horse radish cut in bits. Let it down in the wine, and leave it there two days ; take this out, and put another, repeating the same till the wine is perfectly restored.

XLI. *Another way.*

Fill a bag with wheat, and let it down in the wine ; it will have the same effect.

XLII. *Another way.*

Put a drying in the oven, as soon as it is heated, one dozen of old walnuts ; and, having taken them out along with the bread, thread them with a string, and hang them in the wine, till it is restored to its good taste ; then take them out again.

XLIII. *To cure those who are too much addicted to drink wine.*

Put, in a sufficient quantity of wine, three or four large eels, which leave there till quite dead. Give that wine to drink to the person you want to reform, and he or she will be so much disgusted of wine, that though they formerly made much use of it, they will now have quite an aversion to it.

XLIV. *Another*

XLIV. *Another method, no less certain.*

Cut in the spring a branch of vine, in the time when the sap ascends most strongly; and receive in a cup the liquor which runs from that branch. If you mix some of this liquor with wine, and give it to a man already drunk, he will never relish wine afterwards.

XLV. *To prevent one from getting intoxicated with drinking.*

Take white cabbages, and four pomegranate juices, two ounces of each, with one of vinegar. Boil all together for some time, to the consistence of a syrup. Take one ounce of this before you are going to drink, and drink afterwards as much, and as long, as you please.

XLVI. *Another way.*

Eat five or six bitter almonds fasting; this will have the same effect.

XLVII. *Another way.*

It is affirmed, that if you eat mutton or goat's lungs, roasted, cabbage, or any seed, or wormwood, it will absolutely prevent the bad effects which result from the excess of drinking.

XLVIII. *Another way.*

You may undoubtedly prevent the accidents resulting from hard drinking, if before dinner you eat, in salad, four or five tops of raw cabbages.

XLIX. *Another method.*

Take some swallows beaks, and burn them in a crucible. When perfectly calcined, grind them on a stone, and put some of that powder in a glass of wine, and drink it. Whatever wine you may drink to excess afterwards, it will have no effect upon you.

The whole body of the swallow, prepared in the same manner, will have the same effect.

L. *Another*

L. *Another way.*

Pound in a mortar the leaves of a peach-tree, and squeeze the juice of them in a basin. Then, fasting, drink a full glass of that liquor, and take whatever excess of wine you will on that day, you will not be intoxicated.

LI. *A method of making people drunk, without endangering their health.*

Infuse some aloe wood, which comes from India, in a glass of wine, and give it to drink. The person who drinks it will soon give signs of his intoxication.

LII. *Another way.*

Boil in water some mandrake bark, to a perfect redness of the water in which it is a boiling. Of that liquor, if you put in the wine, whoever drinks it will soon be drunk.

LIII. *To recover a person from intoxication.*

Make such a person drink a glass of vinegar, or some cabbage juice, otherwise give him some honey. You may likewise meet with success, by giving the patient a glass of wine quite warm to drink, or a dish of strong coffee, without milk or sugar, adding to it a large tea-spoonful of salt.

LIV. *To prevent the breath from smelling of wine.*

Chew a root of *iris troglotida*, and no one can discover by your breath, whether you have been drinking wine or not.

LV. *To preserve wine good to the last.*

Take a pint of the best spirit of wine, and put in it the bulk of your two fists of the second peel of the alder-tree, which is green. After it has infused three days, or thereabouts, strain the liquor through a cloth, and pour it into a hogshead of wine. That wine will keep good for ten years, if you want it.

C H A P. XII.

Concerning the Composition of VINEGARS.

I. *To make good wine vinegar in a short time.*

THROW some *Taxus* wood, or yew-tree, in any wine, and it will not be long before it turns into vinegar.

II. *To change wine into strong vinegar.*

Take tartar, ginger, and long pepper, of each equal doses. Infuse all for one week in good strong vinegar, then take it out, and let dry. And whenever you want to make vinegar, put a bag full of these drugs in wine; it will soon turn into vinegar.

III. *To make very good and strong vinegar with the worst of wines.*

Grind into subtile powder five pounds of crude tartar. Pour on it one pound of oil of vitriol. Wrap up the whole in a bag, tie it, and hang it by the bung-hole, in a cask of bad and totally spoiled wine. Move and stir now and then that bag in the wine, and it will turn into very good vinegar.

IV. *To turn wine into vinegar in less than three hours.*

Put in the wine a red beet, and it will be quite sour, and true vinegar, in less than three hours.

V. *To restore such a wine to its first taste.*

Take off the red beet, and in its stead put a cabbage root into that wine, and it will return to its primary taste, in the same space of time.

VI. *An excellent preparation of vinegar.*

1. Take white cinnamon, long pepper, and *cyprus*, of each one ounce; round pepper, half an ounce; and two nutmegs. Pulverise each drug separately, and put them in so many distinct bags. Put them in six different and separate quarts of the best vinegar, and boil them two or three minutes.

2. Then boil separately six quarts of good wine.

3. Season a cask, which is done by pouring a quart of the best vinegar into it, with which you rinse it. Then pour in your boiled wine and vinegars, and fill half-way the cask, with the worst and most spoiled wine. Stop the cask, and keep it till the vinegar is done. You may then draw from it, and refill the cask with the same quantity of bad wine, as you take off vinegar.

VII. *To render vinegar alkali.*

Saturate any quantity of vinegar with salt of tartar.

VIII. *To make, in one hour, good rose vinegar.*

Put a drachm of hare's marrow in a pint of wine, and you will see the consequence.

IX. *Another method to make such vinegar in an instant.*

1. Take common roses, and unripe blackberries, which grow in hedges, of each four ounces, and of barberry fruits, one. Dry them all in the shade, and reduce them into subtile powder.

2. Mix two drachms only of this powder into a glass of white or red wine, then let it settle to the bottom, and strain it through a cloth. It will be a very fine vinegar.

X. *To*

X. To operate the same in one hour's time, on a larger quantity of wine.

1. Take the best rye-flour, which dilute in the strongest vinegar, and make a thin round cake with it. Bake it quite dry in the oven; then pound it into a fine powder, with which and vinegar you make again another cake as before, and bake it also like the first. Reiterate this operation three or four times.

2. If you hang the last made cake in a cask of wine quite hot, you will turn the whole into vinegar in less than one hour.

XI. The receipt of the vinegar, called the Grand Constable's Vinegar.

Take one pound of damask raisins, and cure them of their stones. Put these raisins in a glazed jar, with two quarts of good rose vinegar. Let all infuse for one night over hot ashes; then boil it the next morning four or five minutes only. Take it off the fire and let it cool. Strain it through a cloth, and bottle it to keep for use, afterwards cork the bottle.

XII. A secret to increase the strength and sharpness of the vinegar.

Boil two quarts of good vinegar to the evaporation of one: then put it in a vessel, and set it in the sun for a week. Now if you mix this vinegar among six times as large a quantity of bad vinegar in a small cask, it will not only mend it, but make it both very strong and very agreeable.

XIII. Another way to do the same.

The root of *rubus idæus*; the leaves of wild pear-tree; acorns roasted in the fire; the liquor in which vetches (peas) have been boiled; horse chestnut powder put in a bag, &c. &c. add greatly to the sharpness of vinegar.

XIV. The

XIV. *The secret for making good vinegar, given by a vinegar-man at Paris.*

1. Pound coarsely, or rather bruise only, one ounce of long pepper, as much ginger, and the same quantity of *pyrethra*. Put these in a pan over the fire with six quarts of wine. Heat this only to whiteness, then put it in a small cask, and set it in the sun, or over a baker's oven, or any other warm place.

2. Now and then add new wine in your cask after having previously heated it as before, and let that quantity be no more than two or three quarts at a time, till the cask is quite full.—If you add a few quarts of real vinegar, it will be the stronger.—Before casking the wine, you must let it rest in the pan in which it has boiled for two or three days.—A glazed earthen pan is therefore preferable to a copper one for boiling the wine in; for during the three days infusion, the copper might communicate a dangerous quality of verdigrease to the vinegar.—When you put some vinegar, as beforementioned, to meliorate this composition, instead of wine, you must take care to heat it likewise over the fire, but not so much as the wine.—Let the cask be well rinsed and perfectly clean, before putting the vinegar in.

3. The wild blackberries which grow among hedges are also very good to make vinegar, but they must be used while red, before they are ripe; then put them in the wine, and heat this to whiteness, and proceed in the same manner as you do with *pyrethra*, ginger, and long pepper.—The dose of black berries is not determined; you may take any discretionary quantity of them, and the vinegar which results from these is very good.

XV. *To make vinegar with water.*

Put thirty or forty pounds of wild pears in a large tub, where you leave them three days to ferment. Then pour some water over them, and repeat this every day for a month. At the end of which it will make very good vinegar.

XVI. To make good vinegar with spoiled wine.

Put a large kettle-full of spoiled wine on the fire; boil and skim it. When wasted of a third, put it in a cask wherein there is already some very good vinegar. Add a few handfuls of chervil over it in the cask, and stop the vessel perfectly close. You will have very good vinegar in a very short time.

XVII. A dry portable vinegar, or the vinaigre en poudre.

Wash well half a pound of white tartar with warm water, then dry it, and pulverise it as fine as possible. Soak that powder with good sharp vinegar, and dry it before the fire, or in the sun. Resoak it again as before with vinegar, and dry as above, repeating this operation a dozen of times. By these means you shall have a very good and sharp powder, which turns water itself instantly into vinegar. It is very convenient to carry in the pocket, especially when travelling.

C H A P. XIII.

SECRETS relative to LIQUORS and ESSENTIAL OILS.

1. *To make as good wine as Spanish wine.*

1. TAKE one hundred pounds weight of dry raisins, from which pick off the stems, and open the fruit with a knife. Put these in a large wooden tub; very clean. Boil fifteen gallons of rain-water, purified by straining through the filtering paper. Pour it over the raisins, and cover it to preserve the heat of the water. Twenty-four hours after take off the raisins, which will be swelled, and pound them in a large marble mortar, then put them again in the tub. Heat fifteen gallons more of water, which pour over the other with the raisins, and throw in twenty five pounds of coarse sugar. Stir all well, and cover the tub over with two blankets. Three days after, by a cock placed at the bottom of the tub, draw out all the liquor, and cask it, adding six quarts of brandy to it. Press the ground with an apothecary's press, and put the juice in the cask, with two pounds of white tartar pounded into a subtile powder, in order to promote the fermentation, and five or six ounces of polychrest salt, and a knot of garden cress seed, of about sixteen or eighteen ounces weight, and another knot of seven pugils of alder flowers. These knots are to be suspended by a thread in a cask.

2. If the wine look too yellow, you must strain it through a jelly-bag, in which you shall put one pound of sweet almonds pounded with milk. The older the wine, so much the better it is.

3. To

3. To make it red, dissolve some cochineal pounded in a certain quantity of brandy, along with a little alum powder, in order to draw the better the dye of the cochineal, which put to digest on a sand bath. Till the brandy has assumed a proper degree of colour, give it to your wine in a sufficient degree.

4. It is preferable to clarify the sugar well, and to put it in the cask instead of the tub.

II. *Another way to imitate Spanish wine.*

Take six quarts of white wine; Narbonne honey, one pound; Spanish raisins as much; coriander bruised, one drachm; coarse sugar, one pound. Put all in a kettle on a slow fire, and leave it there well covered, for three hours. Strain this through a jelly bag, then bottle and stop it well. Eight or ten days after it is fit for drinking.

III. *To make the roffolis.*

1. Boil first some water, and let it cool till it is no more than lukewarm. Take next all the sorts of fragrant flowers the season can afford, and well picked, keeping none but the petals of each flower. Infuse these, each separately, in some of that lukewarm water, to extract their odorous smell, or fragrancy. Then take them off, and drain them.—Pour all these different waters in one pitcher; and to every three quarts of this mixture, put a quart or three pints of spirit of wine, three pounds of clarified sugar, one quarter of a pint of essential oil of anise-seed, and an equal quantity of essential oil of cinnamon.

2. Should your *roffolis* prove too sweet and slimy in the mouth, add half a pint, or more, of spirit of wine.

3. If you think the essential oil of anise-seed should whiten too much the *roffolis*, mix it with the spirit of wine, before putting it in the mixed waters.

4. If you want to increase the fragrancy, add a few spoonfuls of essential oils of different flowers, with one pugil or two of musk, prepared amber, and lump sugar pulverised. Then strain the *roffolis* through a jelly bag

to clarify it, bottle and stop it well. Thus it may keep for ten years, and upwards.

IV. To make a rossolis which may serve as a foundation to other liquors.

Put three quarts of brandy, and one of water, in a glazed earthen pot. Place this pot on a charcoal fire, adding a crust of bread and one ounce of anise-seed, and cover it till it boils. Then uncover it, and let it boil five minutes, and put in one pound of sugar, or more if you chuse. Now beat the white of an egg with a little of your liquor, take the pot off the fire, and throw in the white of an egg. Let this rest thus for three days.

V. To make amborsy.

In the above prescribed *rossolis* water add three or four grains of paradise; as much cochineal pulverised; one clove; a little cinnamon and mace; six grains of coriander, and a quarter part of a lemon.

VI. For the nectar.

Add to the above *rossolis* one quarter of an orange pounded; some orange flowers, and the upper pellicula of an orange pounded in a mortar, with lump sugar in powder, and diluted with the fundamental *rossolis* water above described.

VII. A common rossolis.

Instead of one pound of sugar, put only half a pound, and as much of honey.—To musk it, put about fifteen grains of musk, and as much of ambergris in powder, and pounded with sugar, and mix it in the liquor.

VIII. Another rossolis.

1. Take one pound and a half of the finest white bread, quite hot at coming out of the oven, and put it in a mortar, with half an ounce of cloves bruised; green anise-seed

seed and coriander, one ounce of each ; a quart of good red wine, as much cow-milk ; then lute well the receiver, and all the joints, with starched paper. Let it dry for twenty-four hours, then distil the liquor by the heat of a *balneum marie*, and keep it.

2. Make next a syrup, with brandy or spirit of wine, which burn over lump sugar pulverised in an earthen dish or pan, stirring always with a spoon, till the flame has subsided. Then mix one drachm of ambergris with an equal quantity of sugar ; and having pulverised the whole, put it in a small matrass ; pour over it one ounce of spirit of wine, and put all to digest for twenty-four hours on a *balneum marie*. There will then result a dissolution which will congeal again in the cold.

3. To form your *rossolis*, mix with your first composition, the abovementioned syrup of brandy, and the essence of amber.—If you want the *rossolis* to be stronger, add some more spirit of wine to it, till it is as you desire to have it.

IX. *Another way.*

Boil your syrup to consistence after the common method. When done, add as much spirit of wine as you think proper, as well as of the abovementioned essence of amber, or any other sort you please to prefer ; and you will have as good *rossolis* as that which comes from Turin.

X. *To make Eau de Franchipane.*

Put half a pound of sugar in one quart of water ; add a quarter of a pound of jessamine flowers, which infuse for some time. When you find the liquor has acquired a sufficient degree of fragrancy, strain it through a jelly bag, and add a few drops of essential oil of ambergris.

XI. *Orange flower water made instantly.*

Put one handful of orange flowers in a quart of water, with a quarter of a pound of sugar. Then beat the liquor by pouring it from one vessel into another, till the water has acquired what degree of fragrancy you want it to have.

XII. *Muscadine rose water.*

Put two handfuls of muscadine roses in one quart of water, with one quarter of a pound of sugar. For the rest proceed as before.

XIII. *To make raspberry, strawberry, cherry, or other such waters.*

1. Take the ripest raspberries, strain them through a linen cloth to express all the juice out of them. Put this in a glass bottle uncorked, and set it in the sun, in a stove, or before the fire, till cleared down. Then decant it gently into another bottle, without disturbing the *fæces* which are at the bottom.

2. To half a pint of this juice, put a quart of common water, and a quarter of a pound of sugar. Beat all together, by pouring backwards and forwards from one vessel into another, strain it through a linen cloth, and set it to cool in a pail of ice. It is a fine cooling draught in the summer.

3. Strawberries, cherries, &c. are done in the same manner.

XIV. *Lemonade water at a cheap rate.*

Dissolve half a pound of sugar in a quart of water; rasp over it the yellow part of one, two, or three lemons, as you like, and mix a few drops of essential oil of sulphur in the liquor. Then cut three or four slices of lemon in the bowl, when you put the liquor in it.

XV. *Apricot water.*

Take a dozen of apricots very ripe. Peel and stone them. Boil a quart of water, then take it off from the fire and throw in your apricots. Half an hour after put in a quarter of a pound of lump sugar, which being dissolved, strain all through a cloth, and put it to cool in ice as the others.

XVI. *To*

XVI. *To make exceeding good lemonade.*

On a quart of water put the juice of three lemons, or two only, if they be very juicy. Add seven or eight zefts of them besides, with one quarter of a pound of sugar. When the sugar is dissolved, strain the liquor, and cool it in ice as before-mentioned.

XVII. *To make orangeade the same way.*

You proceed with your oranges as with the lemons. If these be good, but little juicy, you must squeeze three or four oranges, with the addition of eight or ten zefts. If you love odour, you may add some musk and prepared amber.

XVIII. *To make Eau de Verjus.**

Put on a quart of water three quarters of a pound of *Verjus* in grapes picked from the stalks. Squeeze it first in a marble or wooden mortar, without pounding it, for fear the stones should give it a bitter taste. After having put fruit, juice, and all in the water, handle it in the water, then strain it to purge it from the coarsest grounds; add about five ounces of sugar to the strained liquor, or more if wanted, according to the sourness of the fruit. As soon as the sugar is dissolved, pass and repass it through the jelly-bag to clarify it; then cool it in ice, as usual, for drinking.

XIX. *To make orgeat-water.*

Take one ounce of melon seed, with three sweet and three bitter almonds. Pound all together in a marble mortar, adding a few drops of water to it while you pound, to prevent its turning into oil. Make all into a paste with a pestle in the mortar, then add a quarter of a pound of fine white lump sugar in powder, which mix with the paste. Dilute this in a quart of water, and after

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having

* A sort of sour grape used in France as a fine acid in sauces.

having mixed it well, strain it through a flannel. Squeeze well the grounds in it till quite dry, add in the liquor seven or eight drops of essential oil of orange; and if you like it, a quarter of a pint of milk pure as from the cow. Put this to cool in ice, and shake the phial when you serve it in a glass to drink.

XX. Other waters.

The pigeon, the pistachio, and the Spanish nut waters, are made in the very same manner; the milk and almonds of either sorts, being only excepted.

XXI. To make a cooling cinnamon water.

Boil one quart of water in a glass vessel before the fire. Then take it off and put in two or three cloves, and about half an ounce of whole cinnamon. Stop well the bottle, and when the water is cold, put half a pint only of it in two quarts of water with sugar to your palate, a quarter of a pound is generally the proper quantity. When done, cool it, as usual, in ice before serving.

XXII. To make coriander water.

Take a handful of coriander, which shell, and put in a quart of water half cooled again, after having boiled. Add one quarter of a pound of sugar, and when the water has acquired a sufficient degree of taste, strain, cool, and serve it as usual.

XXIII. Anise-seed water.

The anise-seed water is made in the very same manner as the coriander water.

XXIV. Citron water.

Take a citron, which strip of its peel, and cut in slices cross-ways. Put these slices in a quart of water, with a quarter of a pound of sugar. Beat well this water by pouring it backwards and forwards from one vessel into another,

another, and when it has a sufficient taste of the citron, strain it, &c.

XXV. *Cinnamon water.*

Bruise one pound of the finest cinnamon, and put it to infuse for twenty-four hours in four pounds of distilled rose-water, with half a pound or a pint of white wine, which put all together during that time in a glass matrass on warm ashes, and stop well the vessel, so that it should breathe no air. At the end of twenty-four hours increase the fire so as to procure a distillation, by putting the matrass in the *balneum marie*, and keep this liquor in bottles well stopped.

XXVI. *To make cedrat water.*

Have a dozen of fine lemons, which split into two parts. Take out all the kernels, and keep nothing but the pulp wherein the juice is contained. Put them in a new glazed earthen pan. Boil one pound of sugar to the *plume* degree, then pour it in the pot over the lemons. Set this on a good charcoal fire, and boil it again till the sugar comes to the *pearl* degree, and then bottle it.

XXVII. *To make cedrat another way.*

1. Squeeze the juice out of thirteen lemons, which strain through a cloth, and put them aside.—Then put two quarts and a half of water in a pan. In a piece of linen put three other lemons parted into quarters, which tie and suspend in the water, then boil them till the water has entirely extracted the taste of the lemons, and take them out.

2. In this water, thus prepared, put four pounds of sugar, and make a syrup, which clarify according to art, with the white of an egg. When done, put in this syrup the juice of your thirteen lemons, and boil all together again to the consistence of a syrup to the *pearl* degree, then bottle it.

3. When you want to use it, put four or five ounces of sugar in a quart of water, and strain it through a jelly bag, then put in a table spoonful or more of your syrup, beat, cool, and drink it.

XXVIII. *Juniper water.*

Put two pounds of juniper berries with two quarts of brandy in a stone bottle, which stop well, and place on hot ashes to infuse for twenty-four hours. Strain the liquor, and add one pound of sugar, half an ounce of cinnamon, as much cloves, a preserved half peel of a whole lemon, and two pugils of anise seed. These being put in the bottle, stop it well, and place it at two or three different times in a baker's oven, after the bread is out, and when you may bear your hand flat in it without burning.

XXIX. *To make good hydromel, otherwise metheglin.*

Take honey and water equal quantities in weight. Boil them together and skim the honey. When done sufficiently you may know by putting an egg in, which must swim on the top. Pour then the liquor in a cask wherein there has been spirit of wine or good brandy, well soaked with either, and still wet with the spirit, and add two or three grains of ambergris. Stop well the cask, and set it in the sun during the dog-days. When it begins to ferment, unstop the cask to let the scum out, which arises like that of new wine. Observe during all that time not to stir the cask. When the first fire of the fermentation has subsided, stop the cask again, and the hydromel is fit for keeping.

Note. Instead of the sun, you may, in other seasons, make use of the top of a baker's oven, a stove, or a hot-house.

XXX. *To make Eau d'Ange.*

1. Take half a pound of the best cinnamon, and fifteen cloves, which pound into powder and put into a quart of water, with a nut-shell full of anise-seed, and infuse

infuse for twenty-four hours, then boil on a charcoal fire, and strain.

2. If you want to make it stronger, you may, after it is cold, put what quantity you like of brandy, with a proportionable quantity of sugar.

XXXI. *Another Eau d'Ange.*

Put a quart of rose-water in a glass bottle with three ounces of benjamin, and half an ounce of storax in powder, which incorporate all together for four or five hours on a slow fire. Decant the liquor by inclination, and add to this *colatura* six grains of muik, and as many of grey amber.

XXXII. *Another Eau d'Ange.*

1. Take three pounds of rose water, three of orange, and two of melilot flowers; four ounces of benjamin, and two of storax; aloes, and *santalum citrinum*, one drachm of each; cinnamon and cloves, of each one; the bulk of a bean of *calamus aromaticus*, with four grains of musk. Bruise coarsely what may be susceptible of the mortar, and then put all the drugs together in a varnished earthen pan, which set on a gentle fire to boil moderately to the evaporation of one third. Then strain it clear.

2. With the grounds you may make lozenges, with a little gum adragant to compact them.—This ground is used also in making musk vinegar.

XXXIII. *A light and delicate rossolis, known under the denomination of populo.*

1. Boil three quarts of water, then let them cool again. Add one quart of spirit of wine, one of clarified sugar, half a glass of essential oil of cinnamon, and a very little of musk and ambergris.

2. Observe the sugar should not be boiled too much in clarifying, for fear it should crystal ze when in the *rossolis*, and cause clouds in it. Observe also to boil the water

first, as prescribed before using it, to prevent the corrupting of the liquor; which would infallibly be the case were you to employ it unboiled.

XXXIV. *Anglic water.*

1. Take half an ounce of angelica, as much cinnamon, a quarter part of cloves, the same quantity of mace, of coriander, and of green anise-seed, with half an ounce of cedar-wood. Bruise all these ingredients in a mortar, and set them to infuse for twelve hours, with two quarts of genuine brandy, in a matrass or retort. Then distil the liquor by *balneum marie*.

2. Two or three ounces only of this essential spirit in two quarts of brandy, with the addition of a very small quantity of musk and ambergris, will make a very agreeable liquor.

XXXV. *The preparation of musk and amber, to have it ready when wanted to put in cordials.*

Put in a mortar and pulverise four grains of amber, two of musk, and two ounces of sugar. Wrap this powder up in a paper, and cover it over with several others. — With this powder you may perfume such cordials as require it. — The dose is a pugil, taken with the point of a knife, shake lightly in it. You may however increase or diminish this dose, according to your liking.

XXXVI. *To make Eau de Cete.*

To three quarts of boiled water, cooled again, put a gill of essential spirit of anise-seed mixed into three pints of spirit of wine. Add one pint, or thereabouts, of clarified sugar.

XXXVII. *To make the compounded Eau-clairette.*

Take six pounds of the best and finest Kentish cherries very ripe, sound and without spots; two of raspberry; and the same quantity of red currants, ripe and sound, and

and without stalks. Mash the whole in a sieve over a pan. To every one quart of that juice put one of brandy, with three quarters of a pound of sugar, seven or eight cloves, as many grains of white pepper, a few leaves of mace, and a pugil of coriander, the whole coarsely bruised in a mortar.—Infuse all these together, well stopped, for two or three days, shaking it now and then, to accelerate the dissolution of the sugar. Then strain the liquor, first through the jelly-bag, next filter it through the paper, and bottle it to keep for use.

XXXVIII. *The cinnamon water.*

In three quarts of once boiled water, and then cooled again, put half a pint of essential spirit of cinnamon, distilled like that of anise-seed. Add three pints of spirit of wine, and one of clarified sugar. Strain all through the jelly-bag, &c. &c.

XXXIX. *Strong anise-seed water, or animated brandy.*

Put half a pint of essential spirit of anise-seed, into three quarts of the best genuine brandy, with one of boiled water.—If you want it sweet, add clarified sugar. Strain all through the jelly-bag, &c. &c.

XL. *To make white Ratafia, called otherwise Eau-de-Noaiu, or kernel water.*

Pound three quarters of a pound of cherry-stones, wood and kernels, or almonds, in a stone pitcher, with twelve quarts of brandy. Add one drachm of cinnamon, a dozen of cloves, two pugils of coriander, and three pounds and a half of sugar. Let all these infuse together, till sufficiently tasty, and ready to strain, add four quarts of water that has been boiled and is cool again. Then run it through the jelly-bag, and next through the filtering paper; bottle and stop it for use.

XL. Hypocras, both the red and white sort.

1. Take two quarts, more or less, of the best wine, whether red or white. Put in one pound of the best double refined lump sugar, two juicy lemons, seven or eight zest of Seville orange, with the juice squeezed out of another of the same sort. Add half a drachm of cinnamon bruised in a mortar, four cloves broken into two parts, one or two leaves of mace, five or six grains of white pepper bruised, half of a *capsicum*'s pod, and one ounce of coriander bruised, half a pint of genuine cow milk, a golden pippin, peeled and cut in slices.

2. Stir well these ingredients together in your wine, and let it rest twenty-four hours. Then obtain the liquor through the flannel bag, repeating the same till it comes clear.

3. If you want to perfume that *Hypocras*, you must put in the bag when you run it, a little pugil of musk and amber powder prepared; as mentioned in this chapter, Art. xxxv. This may keep for a twelvemonth, without spoiling.

XLII. To make good rossolis.

Dissolve one pound and a quarter of sugar, in half a pint of spirit of wine. Boil it to give an opportunity of skimming it. When done, put it in a large glass bottle, with three pints of good white wine, and a gill of orange-flower water. Musk and amber it as usual, and at your liking.

XLIII. An essence of hypocras, to make this liquor instantly, and at will.

1. Put in a pint bottle one ounce of cinnamon; a little more than half an ounce of cloves; and, on the point of a knife, a little musk and amber, prepared as in Art. xxxv. Fill it half way with the best brandy; then stop it that nothing can evaporate. Set all to infuse for seven or eight days on warm ashes. And, when it shall have waited two thirds, or thereabouts, preserve carefully what shall remain.

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2. When you want to make *hypocras* instantly, melt half a pound of lump sugar in a quart of good wine; and, when perfectly dissolved, let fall one drop or two of the above prepared essence, in a clean glass decanter, in which pour directly the wine with the sugar dissolved in it, then run it through the flannel bag. Bottle it again, or drink it.

XLIV. *An exceeding good Ratafia.*

On a quart of good brandy, put half a pint of cherry juice, as much of currants, and the same of raspberries. Add a few cloves, a pugil of white pepper in grain, two of green coriander, and a stick or two of cinnamon. Then pound the stones of the cherries, and put them in, wood and altogether. Add a few kernels of apricots, thirty or forty are sufficient. Stop well the pitcher, which must be a new one, after all these ingredients are in, let the whole infuse a couple of months in the shade, shaking twice or thrice during that space of time, at the end of which run the liquor through the flannel bag, and next through the filtering paper, then bottle and stop it well for use.

Note. In increasing in due proportion the quantity of the brandy, and the doses of each of the ingredients prescribed, you may make what quantity you like of this *Ratafia*.

XLV. *An essence of ambergris.*

Pound one drachm of ambergris, and put it on a pint of good spirit of wine, in a thick and green glass bottle. Add to it half a drachm of musk in bladder, cut very small. Set this bottle in the full South sun, on gravel, during the dog-days, taking it off every night, and during rainy weather. Stir and shake well the bottle, and its contents, two or three times a day, when the sun strikes on the bottle, that the amber may diffuse in the liquor. One month after, take off the bottle from its exposition, and the essence is made.—Decant, bottle, and stop it for use.

XLVI. *Another, and shorter way of making the same.*

Put two grains of ambergris, and three of musk, in a matrass, with one gill and a half of good brandy. Stop the matrass well, and put it in digestion in a *balneo marie*, for two or three days. Strain it through a piece of flannel, and bottle it to keep for use.

XLVII. *A smelling water.*

1. Put in any quantity of brandy, benjamin, and storax calamite, equal parts; a little cloves and mace, coarsely bruised. Set this a digesting for five or six days on warm ashes. When the liquor is tinged of a fine red, decant it gently from the residue in a glass bottle, and throw in a few grains of musk, before stopping it.

2. Three drops of this smelling water in a common glass tumbler of water, give it a very agreeable fragrance.

3. With the ground, or residue, you may make lozenges, in adding a little gum-adragant to bind them.

XLVIII. *A receipt to compose one pint of rossolis, with which you can make forty.*

1. Take two ounces of galanga; half a one of cinnamon; as much cloves; one of coriander; a pennyworth of green anise-seed; half an ounce of ginger; two drachms of mace, and two of Florentine orrice. Bruise all, and put it to infuse with three pints of the best brandy, in a matrass with a long neck. Adapt it to the receiver, and lute well all the joints, both of the receiver, and the bolt-head, with paper and starch.

2. Twelve hours after it has been a digesting, distil the liquor by the heat of a very gentle *balneum marie*, till you have got about one quart of distilled spirit.—Then unlute the receiver and keep the liquor.

3. You may adapt another receiver, or the same again, after being emptied, lute it, and continue to distil as before. But what will come will be infinitely weaker, though perhaps not altogether very indifferent.

XLIX. *To make a rossolis after that of Turin.*

Take six quarts of water, which boil alone, one minute or two; then put in four pounds of fine lump sugar, which skim and clarify with the white of an egg beaten up with a little cold water. Boil afterwards that sirup to the wasting of a third, then strain through the flannel bag; and, when cold, put in one gill only of the above *rossolis*, prescribed in Art. xlviii. *and of the first distillation*. Add to it besides a pint of spirit of wine, or for want of it, of the best genuine French brandy, in which you shall have put a crust of bread burnt, to take off a certain bitter taste. After all this, perfume the liquor with a few drops of essence of musk and amber.

Note. A pint of the *second distillation* is no more than half a pint of the *first*.

L. *How to make a Sherbet, a Persian species of punch.*

There are various ways of making sherbet—Some make punch here with rum only, others with brandy; others again with arrack, and others with shrub. Some will have it mixed with two of these spirits, and others will make it with white wine. There are some who put acids, others do not; and among the acids, some chuse tartar only, others lemons, and others *Seville* oranges; some again squeeze a little of each of these two last tart fruits together in the same bowl of punch.

It is the same with respect to sherbet, the famous *Persian* drink. They make it with the various sirups extracted from all the odoriferous flowers; and the dose is, one part of such a sirup to ten parts of any spirituous liquor—Or again, they make a weak *rossolis*, with the zests of oranges and lemons boiled together in water with sugar.—Some, in short, will make it with the essential spirit of musk and amber only, put in boiling water with sugar, just as we do our punch.

LI. *An exceeding fine essence of Hypocras.*

1. Take six ounces of cinnamon ; two of *santalum citrimum* ; one of galanga ; one of cloves ; two drachms of white pepper ; one ounce of grains of paradise. Or, if you would not have it so strong, put with the cinnamon and *santalum* one ounce only of white *damum*, and four whole grains of long-pepper. Pound well altogether, and set it to infuse for five or six days in a matras, along with half a pint of spirit of wine, on warm ashes. Decant it next gently, without disturbing the grounds, which put in linen, and squeeze it, to get out all the liquor, which put again in the matras, with twenty grains of ambergris, and six of musk. Stop well the vessel, and set it in a cool place for five or six days more ; then mix both liquors together, and filter them.

2. When you want to make *hypocras*, dissolve half a pound of fine lump sugar, in a quart of white *Lisbon*, or red claret, and let fall fifteen or sixteen drops of the above essence in it, then shake all well together, and you will have a most admirable liquor. To render it still more agreeable, you may strain it through a flannel bag, at the bottom of which you shall have put some pounded almonds.

LII. *To make Vin des-Dieux.*

Peel two large lemons, and cut them in slices ; do the same with two large golden pippins. Put all a soaking in a pan with a pint of good *Burgundy*, three quarters of a pound of lump sugar in powder, six cloves, and half a gill of orange flower water. Cover the pan, and keep it thus for two or three hours, then strain the liquor through the flannel bag. You may musk and amber it, like the *hypocras*, if you will.

LIII. *Burnt wine.*

Put a quart of good *Burgundy* in an open pan, with one pound of sugar, two leaves of mace, a little long pepper, a dozen of cloves, two or three tops of rosemary branches,

branches, and two bay-leaves. Place that in the middle of a wheel-fire of blasting charcoal. When the wine begins to be hot, set the fire to it with a bit of paper, and thus let it kindle and blaze till it goes out of itself. This wine is drank quite hot, and it is an admirable drink, especially when the weather is very cold.

LIV. *To imitate muscat wine.*

In a cask of new white wine (that is to say, before it has worked) introduce, by the bung-hole, five or six tops of alder flowers dried up. Let these flowers hang by a string, and eight or ten days after take them out again. You will obtain a wine which will not differ from muscat.

LV. *Eau-clairette simple.*

Infuse for twenty-four hours three ounces of cinnamon bruised in three pints of brandy. Strain it afterwards through a clean cloth, and add two ounces of good lump sugar, with a pint of rose water. Stop well the bottle, and keep it for use.

LVI. *A violet water.*

Infuse some violets in cold brandy. When these have lost their colour, take them out, and put in new ones. Repeat this till you are satisfied with your tincture. When you take the violets out, you must press them gently; then sweeten that brandy according to discretion; and, if you choose, you may add again a little orange-flowers for the sake of the odour.

LVII. *To make a clear and white hypocras.*

To every one pint of claret, add eight ounces of sugar, and nine, if it be white wine; half a lemon, four cloves, a little cinnamon, which should be double the quantity of cloves; three grains of pepper; four of coriander; a little bit of ginger, and eight almonds cut in bits.—Let the whole be bruised and put into a pan, with the wine poured

poured over it; stir, infuse one hour, and strain through the flannel bag.

LVIII. For the white hypocras.

To make the white *hypocras*, three pints of white wine; one pound and a half of sugar; one ounce of cinnamon; twenty three leaves of mace; two grains of whole pepper; with two lemons cut in slices. Then, when you strain the liquor through the flannel bag, fix a grain of musk in the pucked end of it.

LIX. To make the true Eau-de-Noiau.

Pound one pound of apricot kernels, without reducing them into oil. Then bruise another pound of cherry-stones, wood and kernels all together. Put all in a pitcher of five or six gallons, in which put only three and a half, or four gallons of the best brandy, and two of water; five pounds of sugar; to every one quart of liquor add two grains of white pepper, and eight drachms of cinnamon, both bruised. Let all infuse forty-eight hours, and then strain the liquor through the flannel bag.

LX. To make Eau-de-Fenouillette, such as comes from the Isle of Retz.

Take one pound of *Florence fennel*, the greenest and the newest you can find. Put it in an alembick, with one ounce of good liquorice root, three quarts of brandy, and two of white wine. Distil by the sand bath, two quarts of good essence, which you must take away as soon as the white fumes begin to rise, because they would undoubtedly hurt the liquor by whitening it.

2. To every one quart of this essence, perfectly clear and transparent, add six of genuine brandy, and one of spirit of wine, with one of boiled water that has been cooled again, in which last, just before mixing it with the other liquors, you must introduce one quart also of clarified sugar, or sirup.

3. Make this mixture in a large and wide glazed pan; and,

and, when the doses are thus introduced together, taste the liquor, that you may judge whether or not all are right, and be in time to add either some more essence of fennel, or sirup of sugar, or brandy, &c.—If it taste bitter or rather tart, you may correct that defect by the addition of a little more cold water which had boiled.

4. After this, bruise half a pound of sweet almonds, which put in another pan, with five or six quarts of crude water, and boil well with it, then strain through a flannel bag, in order to season it as it were, by preparing and greasing it. When, therefore, the bag begins to run clear, and all which was in it is almost gone, so that it only drops, change the pan under it, put another clean one, and pour your preparation, such as mentioned in the above n. 3. in the bag, over the ground of almonds which was left in.—Should this process seem too troublesome to you, you may at once mix the half pound of bruised almonds in your liquor, and then throw it in the flannel bag, straining, and re-straining it over and over again in that same bag, till at last it runs clear; to assist it even in which, you may add half a pint of pure and genuine cow milk. But in observing the first prescription, there result less lye at the bottom of the vessel in which you keep it for use.

5. When you run it for the last time, which cannot be before it runs quite clear, observe to put a funnel on the mouth of the pitcher or bottle which receives it, and over it a crape, in order to retain the spirits which might evaporate.

6. You may amber afterwards the liquor, with a little powder of musk and amber, prepared as mentioned in Art. xxxvi. of this chapter. This liquor is of a superior delicacy.

LXI. *To make an hypocras with water.*

Take half a pint of white wine, and six times as much water which has boiled; add the juice of two lemons, and five or six quarters; the juice of a Seville orange, twenty-four grains of cinnamon; two or three cloves; one leaf of mace; one pugil or two of bruised coriander; four grains of whole pepper bruised; one quarter of a pound of

of golden pippins cut in slices; half a pound of sugar; half a Portugal orange, with a few zests, and a quarter of a pint of milk. Mix all well; and two hours after the infusion, strain it through a flannel bag, and perfume it with a little prepared powder of musk and amber. Some, however, who do not like amber, content themselves with increasing only the dose of cinnamon.

LXII. *Various liquors made with hypocras.*

You can make hypocras with either of the following liquors; *viz.* Spanish wine; Muscat, Rhine-wine, Hermitage, Champaign, &c. adding to any of these wines the same proportion of ingredients as above described; and clarifying well afterwards by means of filtration.

LXIII. *A rossolis, Turin fashion.*

In three quarters of a pint of orange-flower water put to infuse a little storax, a little musk, a little amber. Twenty-four hours after these ingredients have been put together, set them a boiling for half a quarter of an hour on the fire, then strain it through a cloth. Add next a pint of genuine French brandy. Should any tartness be prevailing, add some honey or sugar, according to discretion. But if you choose to have it stronger, then you may add spirit of wine, till the taste is come to the degree of strength you would have it.

LXIV. *An admirable oil of sugar.*

Rinse a matras with vinegar, then put in it some dry powder sugar, or lump sugar pulverised. Keep that matras on hot ashes, turning and whirling it round and flat ways, by means of the neck of the matras which you hold in your hands with a cloth, and stop it not. The effect is such, the heat occasions the vapours to rise about the matras, which by turning and whirling it as above-mentioned, makes the sugar which is in it re-soak and imbibe them again. This operation dissolves the sugar, and reduces it into a sort of oil.

LXV. *Another*

LXV. Another oil of sugar, without the assistance of fire.

Take a lemon, which hollow and carve out inwardly, taking out all the pulp as skilfully as possible. Then fill it up with sugar-candy in powder, and suspend it in a very damp cellar, with a basin under it. There will drop an exceeding good oil, which is endowed with the most admirable qualities for consumptive people, or them who are affected with a difficulty of breathing.

Note. A little of that oil in liquors gives to any one of them, to which it is added, a very fine flavour.

LXVI. An admirable essence of red sugar.

1. Pulverise five pounds of the best double refined, or royal sugar; which when done, put along with eight ounces of brandy in a large matras, over a sand bath. Distil some part of this first, on a slow fire, to avoid burning the sugar. Re-put the distilled liquor over the sugar again in the matras. Continue to distil and pour the liquor again in the matras over the sugar, till the sugar becomes red, which will happen at the seventh or eighth iteration of distillation.

2. Now distil out all the brandy, and on the remaining sugar pour common water, which distil also, then add some more, continuing so to do, till you have drawn out all the tincture of the red sugar.

3. Take next all these red waters, and run them through the filtering paper, then distil the phlegm on a gentle fire to siccit (or drynes). Put again this distilled phlegm on the residue. Which place all together in a cold cellar. You will find some red chrystals, which pick up, and when dry, pulverise; then pour brandy over to dissolve. This admirable quintessence of sugar has the virtue of preserving the radical moistness of the inside, and our health.

LXVII. Another oil of sugar, excessively good.

Cut off the end of a large lemon, of which squeeze out the juice; then fill it with fine sugar, and apply to it again the cut-off piece. Put it in a clean glazed pipkin,

pipkin, which place to boil one quarter of an hour; put it in a bottle; it will never congeal, and that oil is good for the stomach, colds, catarrhs, &c. The odour and taste are both excessively agreeable. The dose is one table spoonful at a time.

LXVIII. How to extract the essential oil from any flower.

Take any flowers you like, which stratify with common sea salt in a clean earthen glazed pot. When thus filled to the top, cover it well, and carry it to the cellar. Forty days afterwards put a crape over a pan, and empty all on it to strain the essence from the flowers by pressure. Bottle that essence, and expose it for four or five weeks in the sun, and dew of the evening to purify. One single drop of that essence is enough to scent a whole quart of liquor.

LXIX. Essence of jessamine, roses, and other flowers.

1. Take roses of a good colour, and fresh gathered. Pick all the leaves, which expand in the shade on paper. For two or three days, during which you are to leave them there, asperse them, morning and evening, with rose water, stirring them each time.

2. When this has been performed, put them in a glass, or varnished vessel, which stop as perfectly as you can, and place in the hottest horse-dung, which renew every five days. A fortnight after this, place the vessel in a *balneo mariae*, adapting a bolt-head to it and a receiver, and lute all well. Distil the water, on which you observe the essence swimming. This you must divide by means of a wick, or filtering paper. Put the essence in a glass phial well stopped.

LXX. To draw the essential oil of roses.

Pound in a mortar thirty pounds of leaves of roses with three pounds of common decrepitated salt; then put all in a pot well luted, which set in a cool place. Fifteen or eighteen days after, moisten well this matter with common water, stirring it till reduced into a pap.

Then

Then put it in an alembic with its refrigerator. Make a pretty smart fire, which will send first the water, next the oil, susceptible of congealing by cold, and liquifying again by heat. One drop of that oil gives more smell a hundred times than the distilled water from the same roses.

LXXI. *The oil of cinnamon.*

Bruise first the cinnamon coarsely in a mortar, and put it a-soaking in water, in which add a little pounded tartar, with a table spoonful or two of honey. Eight or ten days after, place the vessel on a sand bath, and you will obtain by distillation, an excellent oil of cinnamon.

LXXII. *An essence of jessamine.*

Dissolve over the fire, one quarter of a pound of sugar in a quarter of a pint of common water. After having skimmed it, boil it to perfect evaporation; then take it off the fire, and fling two handfuls of jessamine flowers in it. Cover the vessel, and two hours after, strain the essence, and bottle it. It is an agreeable odour. The dose is one drop only, or two per pint of liquors.

LXXIII. *Essence of ambergris.*

Set to infuse, half a dozen of lemon peels in three half pints of spirit of wine, set them thus in a cold place for two days, in a vessel well stopped. After that time take off the peels, which squeeze through a linen, and put as many fresh ones in the stead, which reiterate three different times. When you take off the last peels, grind three grains of ambergris and one of musk, which put with the spirit of wine in a matrass over a gentle fire, till the amber is perfectly dissolved. There will fall some ground at the bottom of the matrass, decant the clear part from it in a bottle, and keep it for use.

Note. This essence might be made with the burning spirit of roses.

LXXIV. *Essence*

LXXIV. *Essence of capon and other fowls.*

Cure the inside of any fowl, by taking away all the entrails. Fill it with lump sugar, pulverised and mixed with four ounces of damask raisins, perfectly stoned. Sew the fowl up again, and put it in a pipkin, which cover carefully with its lid, and lute all round with paste. Place this pot in an oven, when the bread goes in, and take it out along with it. Then uncover it, and strain the liquor through a cloth, with expression of the animal. This essence is the greatest restorative for old or enervated people; likewise to hasten the recovery of health after long illness. Take two large table spoonfuls early in the morning fasting, and as much at night after supper.

LXXV. *Virginal milk.*

1. Take one ounce and a half of benjamin; storax as much, and one of eastern white balm. Put all in a thick glass phial, with three half pints of spirit of wine, which pour over. Put this in digestion over hot ashes, till the spirit of wine appears of a fine red colour.

2. To use it, put four drops in half a pint of water, and it instantly turns as white as milk.

3. Exteriorly used, it whitens the skin, if you wash with it; it has likewise the same effect upon teeth, by rinsing the mouth, and rubbing them with it. Internally taken, it cures the heats and burning of the extinction of voice.

LXXVI. *How to make the hipotique.*

To every quart of water, put one quarter of a pound of sugar, which boil and skim carefully. Then add a few cloves, a little cinnamon, and some lemon zest, which boil altogether four or five minutes longer, and strain it through a cloth. To colour it, you may put half a pint of good red wine to each quart of water, and to give it a certain *piquant*, you may add a little brandy if you like.

LXXVII. *An exceeding good ptisan.*

Boil well in six quarts of water, one pound of liquorice root: to which you may add one handful or two of coriander seed, and a few cloves. Two or three hours after this infusion, strain the liquor through a cloth, and keep it to make ptisan, when you want it, by putting a discretionable quantity of it into some common water with a few lemon peels to give a pointe. The liquorice may serve twice.

LXXVIII. *How to colour any sort of liquor.*

Bruise into a coarse powder some *santalum rubrum*, which put into a bottle with a discretionable quantity of spirit of wine poured over it. In five or six hours time the tincture will be very high; therefore it will be fit to give a colour to any liquor you chuse, by pouring some of it into the liquor, and shaking it till you find it is coloured to your liking.

LXXIX. *A ladies fine rouge, not hurtful to their skin like other rouges, wherein there always enters a mixture of lead or quicksilver.*

The above preparation of *santalum rubrum*, modified with common water to take off the strength of the spirit of wine, and an addition of one clove, a little civet, a little cinnamon, and the bulk of a filbert of alum, per quarter of a pint of liquor, with safety.

LXXX. *A fine smelling water, at a small expence.*

Take two quarts of rose water drawn by distillation in *balneo mariæ*, which put in a large bottle filled with fresh rose leaves. Stop this bottle well with a cork and wax, then expose it to the sun, for a month, or six weeks; afterwards decant the liquor into another bottle, in which, for every one quart of liquor, add two grains weight of oriental musk, and cork it well. This water is of a charming fragrancy, and lasts a great while. It communicates the odour to them you touch after having rubbed your hands with it.

LXXXI. *Eau-imperial, or imperial water.*

1. Dry in the sun for a fortnight, the rinds of twenty-four oranges. Then pound a quarter of a pound of nutmegs, the same quantity of cinnamon and as much cloves. Soak all together in a large bottle with rose water, and expose it for seventeen days in the sun.

2. Then pound one pound of rose leaves which have been gathered two days before, with two handfuls of sweet marjoram, two pounds of lavender, two handfuls of rosemary, two pounds of cypress, two handfuls of hyssop, as much wild roses and as much betony. Put all these together in a bottle well stopped, and place it in the sun for two days; then having poured some rose water over them, set them again three days longer in the sun.

3. When this is done, have an alembic ready, in which make a bed of one pound of roses, and over it another bed of one half of your *aromates*; next, another bed of one pound of violets of March, and over it a bed of the other half part of your *aromates*, with a scruple of musk, and as much of ambergris. Adopt the receiver to the bolt head, and distil the liquor by gentle heat.

4. When the water is entirely distilled, let the vessels cool, then unlute them, put on the *fæces* a pint of rose water. Lute the vessels again, and distil this water as you did the first. Unlute again and put vinegar in the alembic over the same *fæces*, and distil it likewise as you did the preceding waters. This vinegar will have great virtues, and especially that of preserving you against an air infected by contagious and pestilential disorders.

LXXXII. *The syrup of orgeat of Montpellier.*

1. Take a pound of barley soaked in water; pel it grain by grain, make a knot of it in a bit of linen. Put this in a pot over the fire with about a quart of water. Boil it gently three or four hours, put into the water one pound of sweet almonds, which mix and lute well. Then take off the knot of barley, which pound like the almonds and mix like them in the water. Strain all together through a piece of linen; then pound the grounds well,

well, and pour all the water over it again, which stir and strain ag in. This water will look very thick. Put one pound of lump sugar in powder to that liquor, and boil into a syrup. You will know that the syrup is done to its right degree if, letting one drop fall on the back of your hand, it remain in the form of a pearl. Then take it off from the fire, and when cold, give it what flavour you chuse, whether amber, musk or other odour. Such is the syrup of orgeat, which bottle and keep for use.

2. To make the draught which, in coffee houses or other places of refreshment, is called *orgeat*, put at the bottom of a decanter, one ounce of that syrup, and pour common water over it, then shake the decanter well to mix the water and syrup together. It is fit for drinking directly.

LXXXIII. *To make an imitation of coffee.*

1. Take any quantity of horse beans, which put into a pan to roast over the fire till they begin to blacken. Then take a little honey with the point of a knife and put it among the beans, turning them well with it, till soaked in the beans, repeating the same process till they are of a deep brown chesnut colour. Now take them from the fire, and while they are quite burning hot, put for every large handful of beans, half an ounce of *caſia mundata*, with which imbibe them well by stirring and shaking in the pan as much as you can, and they are done.

2. These grind in the mill and make coffee of, it will have the same taste and flavour as the true Moca-coffee, so as not to be distinguished from it by the greatest connoisseurs.

Note. This coffee may be drank either thick or clear, with sugar as usual.

LXXXIV. *Another way.*

Take a quart of rye, which clean and roast as the beans in a pan till of a fine brown, then grind it. To use it, mix it half and half with the true coffee, and make it as usual, by putting it in boiling water and letting it boil five minutes.

Note. This coffee is much used among the people of quality, who prefer it to strengthen the stomach, especially when taken before going to bed.

LXXXV. *Directions for preparing the true coffee.*

1. True coffee must be roasted in an iron pan, or in a glazed earthen pan, over a clear charcoal fire without flames. Turn it with a stick while it is on the fire, to make each grain roast more regularly and equally. It is well roasted when it is all of a dark brown.
2. There is a much better method of roasting it, by means of a certain iron drum made in the form of a ladies muff-box, with a handle at one end, an iron peg at the other, and a latch-door in the middle. By this door you introduce the coffee, which you fasten in by means of the latch. Then propping it on the top of a chasing-dish made on purpose, in which there is a charcoal fire, you roast the coffee by turning the drum over it with the above-mentioned handle ; and thus the coffee roasts in the most regular manner.
3. When the coffee is roasted, grind it, keep it closely confined in leaden boxes, with a screwing lid. However, it is still much preferable to grind no more at a time than what one wants to use at once.
4. The liquor is made by putting one ounce of that powder to three quarters of a pint of boiling water to make three full dishes. And, after an infusion of ten minutes, during which it is kept boiling, the coffee is fit for drinking.

LXXXVI. *A receipt for making chocolate.*

1. Dissolve in a copper pan some pulverised royal lump sugar, with a little orange water. When the sugar is turned into a syrup throw in the cocoa, the vaniloe, the cinnamon. Mexican-pepper, and cloves, all, and every one of which, ought to have been first reduced into an impalpable powder. Stir all well while it boils ; and when you judge it to be sufficiently done, pour the paste on a very smooth and polished table, that you may roll it, and give it whatever form and shape you like.

2. To

2. To prepare it with either milk or water, in which, when boiling hot, you first dissolve it, then, with a box-mill, with a long handle, you mill it to froth in the pot in which it is a making, and pour it afterwards in cups to drink.

C H A P. XIV.

SECRETS relative to the CONFECTIONARY BUSINESS.

I. *Preserved nuts.*

1. GATHER the nuts, before the woody shell begins to harden under the green rind. Cut open and throw off that green rind; and throw immediately the nut into a pail of cold water, to prevent its blackening. Boil them four or five minutes, and throw the first water away because it is bitter. Put fresh water, which boil again, and throw away as the first, and repeat this operation a third and fourth time, if required, to take off all the bitterness of the nuts.

2. After they have boiled in their last water, take them out, and throw them into cold water, for fear they should turn black still. From this water change them again into another, in which put them one by one, as you take them from the first, and pressing them between your fingers to purge them from all the bitter water they might still contain.

3. Now make a syrup as usual, in which boil some lemon peels for the sake of fragrancy only, taking them

alboult after a few minutes of their being in, then put the nuts in their stead, which leave to boil in the syrup as long as you think proper.

II. Orange flower-paste.

1. Boil in four quarts of water one pound of the bare leaves of orange flowers well picked. When these are deadened and softened by this boiling, take them out with a skimmer, and set them to drain. Then pound them in a mortar with the juice squeezed out of two lemons, more or less, according to your taste.

2. In the juice, which comes from these flowers by pounding, dissolve one pound of sugar, and put the paste in. Stir it a little, then let it cool, and shape it afterwards to your liking.

III. Paste of jessamine.

Have one quarter of a pound of jessamine flowers, pick them. Boil them in water till softened, and they have given their odour to it. Then take the flowers out, which drain, and pound in a marble mortar. Put sugar in the water, and boil it to a syrup; put the paste and spirit in while it boils, for two or three minutes. Now take it out, and shape it as you would like to have it.

IV. Apricot paste.

Boil one pound and a half of sugar into a syrup. Put in three pounds of apricots, deterged of their skin, and pounded in a marble mortar, &c. Then proceed as above for the rest, observing only to chuse the ripest apricots you can find.

V. Currant paste.

1. Weigh ten pounds of currants, which put into a pan with one of clarified sugar. Skim them while on the fire, and after they shall have boiled a while, drain them on a sieve, then strain them.

2. Now put this liquor again in the pan and boil it, adding more sugar in powder, till consumed and wasted to the consistence of a paste. Then form the paste in the shape you like.

VI. *A verjus-paste.*

Chuse *verjus* half ripe: cure it from all stones, and put it in a pan on the fire with a pint of water to every three pounds of fruit. After five minutes boiling take it out and drain in. Squeeze it through a sieve, then waste it to thickness for a paste. Now boil as many pounds of pulverised lump sugar to a syrup, as there are of fruit. When done, abate the fire, and add the fruit paste to the syrup, continuing to concoct all together on a mild fire. Then give the paste, as soon as it is come to a proper consistence, what shape you like.

VII. *How to make syrups with all sorts of flowers, which shall be possessed of all their taste, flavour and fragrancy.*

Heat in a pan about half a pint of water, then put in it sugar in the proportion to the quantity of flowers you may have; boil, skim and thicken it to a proper consistence. When done put your flowers in a glazed vessel, and cover it over with a linen, thro' which pouring the syrup, you strain this upon the flowers. These being thereby quite deadened, put all together again in the same piece of linen, and strain it again in another vessel, squeezing well the flowers. Then bottle this syrup, and keep it for use well stopped.—Whenever you want to give the flavour of those flowers to any liquor, sweeten it with this syrup.—To every four ounces of flowers, the quantity of sugar requisite to make that syrup is generally one pound and a half.—Observe that all flowers must be well picked of all their cups, Itaminas, &c. and nothing but their leaves made use of.

VIII. *Raspberry syrup.*

Mash the raspberries, and dilute them with a moderate addition
N 4.

addition of water, then strain them to divide the thick from the clear part. To every quart of this clear liquor put one pound of lump sugar pulverised, boil all together on the fire in the preserving pan. Skim and clarify carefully the sugar, with the white of an egg beaten in water. When the syrum is come to its right degree (which you may know by throwing a drop of it in a glass of water, if the drop sinks whole to the bottom, and fixes itself there, without running out along with the water, when you throw this away), take it off the fire, and let it cool for bottling.

IX. *Apricot syrup.*

Cut in small bits six pounds of very ripe apricots, which boil in a gallon of water till they are reduced to a pulp. Let them cool, then squeeze them through a sieve. Now strain again this liquor through the jelly-bag, and put it in the preserving pan on the fire, with four pounds of sugar. Skim, clarify, and boil the whole to a syrup, which try as above directed in a glass of water; and, when done, let it cool, and bottle it to keep for use.

X. *The verjus syrup.*

Have *verjus* in grapes, which pick out of its stalks, and pound in a marble mortar. Strain it through a sieve first, then through a jelly-bag to get it finer. To two quarts of this juice, put into a preserving pan, add four pounds of sugar, and boil it according to art to a syrup.

XI. *A general manner of making syrups, applicable to almost all sorts of fruits, especially currants.*

1. Pick a quantity of red currants of all their stalks, and squeeze them through a sieve in a commodious vessel. Carry this vessel to the cellar, placing it on a stool, or any suspending shelf from the ground: and, after that juice shall have worked three or four days, strain it through a sieve in another vessel, then through the flannel bag to get it as clear as possible.

2. Now for every two quarts of such liquor, have four pounds

pounds of sugar, which put in a preserving pan, and melt over the fire, with a little common water to help the dissolution of it. Boil it thus to the consistence of caramel, without burning it; and, when at that degree, pour through the holes of the skimmer the measured liquor, which must boil also to a perfect syrup according to the afore-prescribed trials.—All this being well executed, take it off, let it cool, and bottle it for use.

Note. All sorts of syrups, such as cherries, raspberries, and others, may be made in the same manner, with this difference only, that they are not to be put to work in the cellar, but employed directly as soon as the juice is squeezed out of the fruits.

XII. *To make liquid currant jam.*

Pick four pounds of currants, and clear them of their stalks. Put aside two pounds and a half of them in a dish, and squeeze the other one pound and a half remaining. Now, in a preserving pan, dissolve four pounds of sugar; and, when come to a syrup, put in the two pounds and a half of whole currants along with one pound and a half of juice of the same, which boil all together to perfection.

XIII. *To make the same with cherries.*

Have two pounds of the finest cherries, take off both tail and stones. Press out the juice of them, and put it in a preserving pan with a pint of water, and four pounds of sugar. Boil all together, then add six other pounds of the finest cherries, from which the tails only, and not the stones, have been picked. Boil all to a syrup, and when this stands the trial of the glass of water, as mentioned above, all is done, and fit for potting.

XIV. *Another way to preserve cherries.*

Put eight pounds of cherries, either with or without their stones, in an earthen pan over a moderate charcoal fire, to evaporate their superfluous moistness; keep incessantly stirring, taking care to avoid mashing them. Then

add four pounds of lump sugar pulverised, continue to stir the cherries, and boil all, so that the bubbles should cover the fruit, and that the syrup might hereby be skimmed till done to perfection, when a drop of it runs with difficulty, being cold ; then the cherries are fit to pot.

XV. *To make the liquid raspberry-jam.*

Boil, to a strong syrup, four pounds of sugar. When done, take the pan off the fire, and put in four pounds of raspberries well picked, and not mashed in the least. Put them in gently at first, and with a very particular care, for fear of squeezing them ; for, when the heat of the syrup has once seized them, they are not so apt afterwards to break. Stir them therefore a little in the sugar, and when they have thrown in their juice, put them again on the fire, to complete the making of the syrup.

XVI. *The verjus jam.*

1. Open four pounds of *verjus* in grapes, with a penknife : and, with the same, pick out all the stones. Throw these grains, as you do them, into a bowl of clean fresh water. When done, take them out again with a skimmer, and put them a-draining in a sieve, throw them next into a pan of boiling water.

2. While this is in the water, let it simmer ; and, when the *verjus* begins to swim on the top of the water, take it directly from the fire, and cover it with a cloth to cool gently, while you dissolve, boil, and clarify four pounds of sugar to a syrup.

3. A little while before the syrup is ready, set your *verjus* a-draining in a sieve, then throw it in the sugar, when this is done to the proper degree. Continue to keep up a gentle, regular fire, till you see the *verjus* taking a good green : and, when that is the case, give it a brisk fire, and finish it quickly, else it would first turn black, and then yellow.—Take care not to do the syrup too much, for it would be apt to candy.

XVII. *The*

XVII. *The same with powder sugar.*

1. After the *verjus* is picked, and the stones taken out as before, it must not be thrown in the cold water, but in a dry preserving pan only, not to lose the juice which comes out of it when cut.

2. Then to every pound of *verjus*, add another of sugar, such as was mentioned, powder this over the *verjus* which is in the pan, and set all on a gentle fire, to simmer and not boil. This will make it come very fine and green, when you must, as in the preceding receipt, be very expeditious in finishing it, for the same reasons therein mentioned already.

XVIII. *Peeled verjus.*

Chuse some fine ripe *verjus*, which peel carefully with the point of a penknife and stone, then throw into a dry bowl, to preserve the juice.—Then dissolve, boil and clarify as many pounds of sugar as you have of fruit, in which, when done to the consistence of a syrup, throw in the *verjus* from the bowl. Stir and boil it gently, till it turns green, and finish it with speed. Let it cool, and put it in very dry pots.

XIX. *To preserve March, double or single violets.*

March violets, you must as soon as they are come to the degree to make them liquid, take them out immediately from the fire, and while the sugar is still boiling, take the violets out of it with a skimmer, and put them a draining in a sieve, or table cloth, till they are cold. Then put them incessantly with your hand, for the space of two hours, and powdering over them, at distances of times, some of the finest royal loaf sugar, in small quantities at a time, in order to dry and candy them.

XX. *Another way to make them liquid.*

If you want to make the best use of the same clarified sugar, which served to make dry preserved violets, you

may do it by putting half a pound or thereabouts, of these flowers in the same syrup then boiling on the fire, and there let them soak and lie for five minutes, they will then be liquid.

XXI. *To preserve apricots.*

Chuse a quantity of apricots, just turned, but not ripe, and the fruit of which has still all its hardness and greeness. Take out the stones, by means of a small-bladed knife, which introduce at the point of the apricot, till you feel the stone, and then push to make it come out at the tail. When you have thus prepared four pounds of them, (weighed after stoning) have a large wide pan of boiling water on the fire, in which throw them in order to blanch them, taking great care that they should not spot in the water. When blanched, take them out with a skimmer, and set them a draining on a sieve. Then boil and clarify four pounds of sugar into a syrup. When done, take it out, and put in your apricots softly, set them again on the fire, and give them two or three bubbles; take the pan from the fire and let them cool. By this means they throw off their superfluous moistness and take the sugar. When cold, take them from the sugar with a skimmer, and set them a draining, while you put the syrup on the fire to boil. When drained, put them again into the boiling syrup, and give them five or six bubbles more, after which let them rest till the next day, put them again on the fire, and finish them. They will be what is called Liquid, and you may pot them in that state.

XXII. *How to make a dry preserve of them.*

Proceed as above-directed, till the time they are fit for being potted in liquid, instead of which take them again out of the syrup, and set them a draining, then range them on slates at regular distances, so that they may not touch one another. When thus prepared, powder on them, through a silk sieve, some of the finest loaf sugar pulverised, and put them in the stove to dry. When dry

on

on that side, take them out from the slates, and turning them the other side upwards on a sieve, or some sorts of small light willow grates made on purpose; powder them again with sugar as before, and when equally dried and cooled, you may put them in boxes with white brown paper.

Note. All sorts of plums admit of the same mode of operation, to make them into dry or liquid preserves.

XXIII. *To preserve green apricots.*

1. Gather apricots when green and very fresh. Then pound some salt in a mortar, and make it as fine as possible, and putting a handful of this salt in a napkin, with as many apricots as you think you can well manage, fold the napkin lengthways, bringing the long sides of it over the apricots, and taking the ends of it gathered one in each hand, shake and roll them backwards and forwards with the salt in the napkin, adding one spoonful or two of vinegar, which pour over them, when thus agitated. This process is with intention of curing them of their down, and when that is obtained, throw them in cold water to wash them well, and continue so to do with the rest.

2. After having thus well washed them in that first water, put them into new cold water, to wash them again, after which, put them a draining on a sieve. Then boil some water, and throw them in, wherein they are to be kept boiling till they become soft, and which take care to try now and then, by taking one or two with the skimmer, and thrusting in a fine skewer; if this get an easy admittance in the apricots, they are sufficiently done. Now take the pan from the fire without delay, and with the skimmer take the apricots from that boiling water into some cold.

3. When your apricots are in this situation, make a sirup with as many pounds of sugar as you have got fruit, and having put in your apricots, let them boil very gently. They will immediately turn of a very fine green. You must not press on the finishing of them; on the contrary, take them off the fire, and give them a couple

of hours rest, during which they throw off their moistness, and take the sugar. After they have thus rested a while, set them again on the fire, and finish them as fast as you can, that they may preserve their greenness.

XXIV. *To make the Cotignac liquid.*

Pare the quinces, and cut them small, after having taken away the cores and kernels. Put a gallon of water a boiling, then put them in, and let them boil there, till reduced almost to a pulp. Strain all through a cloth, and squeeze it well into a bowl. When done, set it on the fire in the preserving pan, with four pounds of sugar, and boil it gently, till taking some with the skimmer, and letting it fall on a plate, it shall rise up like a jelly. Then push on the fire, and in five minutes afterwards the *Cotignac* is done.

Note. If you put the peel and kernels into a knot, and boil them in that manner in the water, the jam will sooner be red.

XXV. *Another way.*

Pare four pounds of quinces, which cut into bits, and put in the preserving pan, with a sufficient quantity of water to soften them by boiling gently. Then add four pounds of lump sugar, and continue boiling the whole till it is half done. When this is the case, strain all through a cullendar, and put it again in the same pan over the fire to boil it to perfection, which you know, when by stirring the jam hard, you may see the bottom of the pan quite plain, and entirely uncovered. Then it is time to take the pan from the fire, to let it cool and pot the marmalade.

XXVI. *How to make the caramel.*

Boil some sugar till it be almost in powder; then for every half pound of sugar, throw in one ounce of syrup of capillaire, and immediately throw the whole into cold water.

XXVII. *To make Raisinet.*

Take black grapes, the best and the ripest. Pick the grains from the stalks, throw away these and squeeze the others between your hands, and put both the hudds and the juice in the preserving pan, to boil on a clear smart fire. Neglect not to stir well this liquor, all the while it is a-boiling, with a wooden spatula, for fear it should burn at bottom. When you perceive it may have wasted a third, strain it through a shear-cloth, to express the juice out of the hudds. Put your juice again into the pan to boil, and skim it, stirring as before with the spatula, especially towards the end when it begins to thicken. To know when it is done, put some on a plate, and if, by cooling, it becomes solid, it is sufficiently done. Then is the time to take it off from the fire, and let it cool, after which you put it into stone jars.

XXVIII. *To preserve quinces in red.*

1. Chuse the most even quinces not stony. Cut them into four or eight quarters as you like best, then pear and core them. If you meet with any stones in the quarters, cut them off too. As you prepare them thus, throw them into cold water. Save the peels and cores; and mixing among them, when all your fruits are prepared, such of them as are small, crooked, and otherwise ill formed, and unfit to go along with the others, boil all in a sufficient quantity of water to make a streng decoction, which pass when done, and strain through a strong cloth into a pan.

2. In this decoction, put other quarters, and boil them in the preserving pan. When sufficiently done, put as many pounds of sugar as you had fruit. Boil this gently, and in a short time the quinces will become most beautifully red. When you see they are come to perfection, take them off the fire, and pot them; but do not cover them for a day or two after.

XXIX. *To*

XXIX. *To do the same in white.*

1. You must not make the decoction of the parings. When the fruit is pared as beforementioned, you must throw it into boiling water, and there let it continue to boil on the fire, till sufficiently done; then take it out with the skimmer, and put it a draining on the sieve.
2. While they are thus a-draining, make a syrup; and when this is skimmed and clarified properly, put your fruit in it boiling. Ten minutes after, or thereabouts, take the pan from the fire, and let all rest a while, then squeeze on it the juice of a lemon to whiten the quinces: and setting them again on the fire, finish them quickly.

XXX. *To preserve rousselet, muscadine, and other pears.*

1. Choose rousselet pears, which should be neither too ripe nor too green; which pare very neatly, and boil in water till properly done. Before boiling them, observe to strike them to the heart from the head, with the point of a knife. When properly done in the boiling water, take them out with a skimmer, and throw them into fresh water.

2. Make next a syrup, with as many pounds of sugar as you have pears, in which put these, and boil them five or six minutes at first, then take them from the fire, and let them rest a while to throw out their superfluous moisture, and take the sugar. When that is done, set them again on the fire, to complete them quickly.

Note. By doing as above, you will have a liquid preserve of pears; if you want to have them dry, follow the directions given in Art. xxii. with respect to apricots.

XXXI. *A preserve of green almonds.*

1. Prepare a lye of pearl ashes, in which wash your almonds to rub their down off. Wash them next in another water, then into boiling water, in which they are to boil till softened, but not to open, which try now and then, by thrusting a fine skewer in some of them. When done enough, skim them out from this water, and throw them into cold, then set them a-draining in a sieve.

2. Now,

2. Now make a syrup, and throw your almonds in while boiling. They will immediately recover their green; then finish them as expeditiously as you can for fear they should turn black.—If you want to keep them, you must put pound for pound of fruit and sugar.

XXXII. *To make the same into a compote.*

After having softened them by boiling in water, put no more than five or six ounces of sugar to every pound of fruit. Then boil the syrup into a pretty strong consistence, because it liquifies sufficiently afterwards by the moistness which the fruit retains.

XXXIII. *To make dry portable cherries.*

Prepare four pounds of fine Kentish cherries, by depriving them both of their stones and tails. Then have one pound of sugar, which put a-dissolving on the fire in a pint of water. When this begins to boil, throw your cherries quickly in, and make them boil thus in the sugar till the syrup begins to thicken. When they are sufficiently done, take them from the fire, and let it cool, after which put them a draining in a sieve; then range them on slates, and powder through a sieve some sugar all over them, and place them in the stove, or for want of this convenience, in a baker's oven, after the bread has been taken out. When dry on one side turn them on the other, and powder them over with sugar as you did before; dry them in the same manner, and box them when cold, to keep for use.

Note. Plums may be done in the same manner. This sort of preserve is very agreeable, and may be carried any where.

XXXIV. *The preserve of orange flowers, whether in loose leaves, buds, or bunches.*

Have four or five pounds of orange-flowers; and that you may lose nothing, but make the best you can of them, put them in alembic with two gallons of water. Lute well the vessels, and distil about two quarts of good water.

water. Stop then the distillation, let the vessel cool; and unluting them, put the orange-flowers a-draining on a sieve. When done, throw them afterwards in cold water, squeezing over them the juice of a small lemon to whiten them. Now take them out again from this water, and put them in a very light and thin syrup, lukewarm, for them to take the sugar. When quite cold skim the flowers out of this syrup, and set them a-draining in a sieve placed over it. After they are well drained, boil this syrup for five or six minutes, then let it cool again, till only lukewarm, and then put your flowers a-soaking again for twenty-four hours in it. On the next day skim them off again, and repeat the same operation over again exactly as you did the day before. At last skim them out once more from the sugar, and put them a-draining for the last time, after which scatter them on tin sheets, slates, or small boards, and having powdered them over with sugar, put them a drying in an oven; when dry on this side, turn them on the other, and repeat the same again, till all is done, and fit to put in boxes.

XXXV. *A marmalade of orange flowers.*

1. Take one pound of them, which wash and dry in a cloth, and having put them in a mortar, give them a few strokes of the pestle only to bruise them a little, not to mash them quite, and to whiten them, squeeze the juice of a lemon over them.

2. Now clarify three pounds of royal sugar; and when come to a proper syrup, throw in the orange flowers, which boil five or six minutes, and let cool. When cold, stir all well with a spatula, in order to mix equally the flowers along with the syrup, then put the jam into pots; and having left them twenty-four hours uncovered, paper them over as usual.

XXXVI. *To make an apricot, or peach jam.*

1. Chuse the ripest apricots, which clean of all hard knobs, spots and rotted parts. Cut them in small bits in a preserving pan, which have previously weighed. If you

you have put four pounds of apricots in it, reduce them by boiling over a gentle fire to two pounds only, which you must find out by weighing pan and fruit together, now and then till you find your right weight. When this is the case, put among your apricots thus reduced to one half, two pounds of lump sugar pulverised, and mix all well for the space of five minutes over the fire, then take all off, let it cool, and pot.

2. This composition you may, if you will, put into paste on slates, or in tin moulds. There is not more exquisite eating. You may also, with two or three roasted, or baked apples, mix a couple of spoonfuls of this marmalade, and make excessive nice tarts with it, or again, with pears baked under ashes.

XXXVII. *An apricot jam, after the French way.*

1. Chuse such ripe apricots as are fit to eat. Peel their skin off very neatly, and give them a bubble or two in boiling water, so as not to have them dissolve in the water, and put them a-draining. When done, mash them through a sieve, and let them rest a time to evaporate their superfluous moistness.

2. While this is doing, make a syrup with as many pounds of sugar as you have fruit, and take it off the fire; when the syrup is cooled, put your fruit in, which stir well with the spatula, then put all again on the fire for ten minutes, in order to make the fruit take well the sugar. When the jam is well done, fine and transparent, pot it.

XXXVIII. *To make raspberry, currant, and cherry jam.*

All these fruits must be squeezed through a sieve, then clarify the sugar, and throw in the juice, bring to perfection afterwards as directed in the last receipt.

XXXIX. *To make a good currant jelly.*

Have four pounds of currants after picking. Then dissolve in water four pounds of loaf sugar, which make into a pretty strong syrup. Now put the currants in, and boil

boil so as to have them covered with the bubbles. Six minutes after such boiling, take the pan off from the fire, and pour the contents in a sieve to strain off all the liquid. Put this liquor again in the pan and boil it, till taking a drop with the skimmer, and pouring it on a plate, it congeals as it cools. Then it is fit to pot.

They who want to spare the sugar, and have a great deal of jelly at a smaller expence, may employ four pounds only of sugar to six of currants, after picking, and proceed as above. They must however observe to do the jelly rather more than in the preceding case, when the fruit and the sugar are pound for pound.

XL. *To make a verjus jelly.*

Take ripe *verjus*, which pick from its stalk. Put it in a pan with a couple of glasses of water. Let it boil for two or three minutes, and when deadened, throw it in the sieve to drain. Then put the juice on the fire with the sugar, and boil it into a jelly, to pot it afterwards.

XLI. *To make an apple jelly.*

1. Cut in small bits a dozen of gold rennets, and put them in the preserving pan, with three quarts of water, which boil to the reduction of one half. Throw all in a cloth to strain it through, and draw all the juice from the apples. Then, to this, put four pounds of sugar, which boil to a jelly.

2. To give a pointe to that jelly, you may add the juice of one lemon, and even the rasping of one half of its rind.

XLII. *To make the conserve of orange flowers.*

Take one quarter of a pound of orange flower-leaves well picked, which chop as small as you can, and wet over by squeezing the juice of a lemon. In the mean while clarify, and make into a strong syrup, two pounds of sugar, then take it off the fire, and let it rest a while. Some time after, stir it all round, and in the middle, with

with a spoon; and having thrown in your orange flower, prepared as before directed, mix all well with the same spoon, and put part of this composition into paper moulds, or cases, and form the rest into drops, or lozenges, on sheets of paper.

XLIII. A conserve of violets.

Pound in a mortar one quarter of a pound of violets well cleansed and picked, which while you are a-pounding, you must wet with a quarter of a pint of boiling water. When it is thus wetted and pounded, strain it through a flannel cloth; then having melted and clarified two pounds of sugar into a strong syrup, take it off the fire, let it rest, and pour in afterwards what you have expressed from the pounded violets, stirring all well together with the spoon, and proceeding in every other respect for the rest as directed in the preceding article.

XLIV. A conserve with raspings of Portugal oranges and lemons, conjointly or separately.

Put your raspings to dry in a plate. Prepare some sugar into a syrup not quite so strong as recommended in the last receipt. Take this from the fire, and stir it with a spoon, both round the pan and in the middle; then throw in your raspings of lemon or orange, or even both together; and having stirred all well, put it in the moulds and make your drops.

XLV. To make almonds a-la-praline.

Make a strong syrup with one pound of sugar. Then throw in two pounds of almonds, which stir well with a spatula, for fear they should stick to the pan till they have consumed all the sugar; then place them over a small fire to dissolve all the little nobs of congealed syrup which remain about the pan, and stir it till there is none left, and all should absolutely stick to the almonds. Have a great care that they should not turn into oil, and take notice when they pop, because it is a sign they are done. Take the pan from the fire, and cover them with a cloth; and when cold, put them in boxes.

XLVI. To

XLVI. To whiten cherries, currants, raspberries, grapes, strawberries, and such like fruits.

Beat one or two whites of eggs with orange flower-water, then steep your fruit in, and roll it afterwards in a dish wherein there is lump sugar pulverised and sifted very fine. When it is well covered over with sugar, put it on a sheet of paper, and set it in the sun to dry it. You may thus ice all sorts of fruits susceptible of icing.

XLVII. To make ice maroons.

Slit the bottom skin of chesnuts, and loosen it without peeling them yet, then throw them into boiling water. When you think they have boiled sufficiently, take a few of them and try whether or not a pin gets easily into them by the slit you have made. If it do, take the maroons from the fire, then peel them one after another as expeditiously as you can while still burning hot, and put them in a dry sieve. In the mean while, boil some new water, and when all are peeled, put them into it, to make them throw all their reddish liquor without putting them any more over the fire, but only into the boiling water which you just took out; when they have well cleansed themselves in this water, take them off with a skimmer, and put them in a light thin syrup, in which boil them gently for ten minutes, then take them off the fire, let them rest so that they may take the sugar, then skim them out of it, and put them in a sieve to drain. Now add some more clarified sugar to your thin syrup, which boil together to a stronger one: then put your maroons in, one by one, set them on the fire again, and boil all till the syrup comes to be what confectioners call *a-la-plume*. Then take them off the fire, and let them rest. Some time after, take a spoon, stirring it on one side of the pan so as to cause a thick and muddy look in the syrup no farther than the width of your hand. While the syrup looks thus, take your maroons gently one by one between two forks, and sauce them well in that thick part of the syrup, then put them on a sieve over a dish.

XLVIII. *To make the royal maffepins.*

1. Take one pound of sweet almonds, which throw in a bowl filled with boiling hot water, to help the peeling of them. In proportion as you peel them, throw them into another bowl filled with cold water. Then drain them, and pound them in a mortar, watering them at the same time so as to make them into a kind of paste. Now put in the preserving pan one pound of sugar with a sufficient quantity of water to dissolve it. Boil it to *a-la-plume*, and then take it from the fire to dilute your paste into it. Set the pan again on the fire, and turn your paste over and over till it quits the pan freely without any adhesion at all. When passing your hand on the paste, you see it smoothening without sticking to your fingers, it is a proof that it is done. Now take it from the fire, and dress it with your spatula on small boards covered with sugar, in the form of small oblong cakes of what size you like.

2. When the paste is all dressed in that form, let it grow quite cold. Then take one cake after another, and give each of them half a dozen strokes of the pestle in a mortar to render that paste more delicate, adding also as you pound it thus, half the white of an egg *per* pound of paste. You may likewise introduce in the paste, while you pound it, a little orange or lemon peel preserved. Then roll it again in the pulverised sugar, and dress it again on the same boards as before, either in oblong cakes or in round rings. When done take and sleep it in whites of eggs beaten with orange flower-water; and draining it well when you take it out, roll it again in pulverised sugar, then put it on a sheet of paper. When every one has thus been worked all through this process, put the sheet of paper thus loaded with these *maffepins*, in an oven, moderately hot to give them only a very faint colouring.

3. They who want their *maffepins* to taste of the bitter almonds, may introduce one quarter of a pound of bitter almonds among the pound of sweet ones, from the very beginning, and for the rest, proceed as directed from the time of peeling.

XLIX. To make Savoy biscuits.

1. Separate the whites of four eggs from their yolks. Beat them by themselves to a very hard froth, at which time put the yolks previously well diluted, and continue beating all well together. Now introduce half a pound of sugar pulverised, and beat them all together again.

2. When you are ready to dress your biscuits, have a quarter of a pound of superfine flour, which incorporate by beating well, then dress it on a sheet of paper in the form you like best, and ice them over with sugar in powder to prevent their running. Put them in an oven, no hotter than for massepins; and after a reasonable time they will be done.

L. To make bitter almond biscuits.

Pound in a mortar three quarters of a pound of bitter and one quarter of sweet almonds. When thus pounded, have eight or nine yolks of eggs, which beat up and mix with your paste of almonds, and two pounds of pulverised lump sugar. This paste must be a good deal harder than that of the Savoy biscuits. Then with the end of a knife taking some of that paste, place it in rows on a sheet of paper, in what form or shape you like, and ice it with pulverised sugar; then put it in the oven as you do the Savoy biscuits or massepins.

LI. To make meringues.

Beat well into a hard froth, four whites of eggs: then introduce in them four large spoonfuls of sugar into a subtle powder, and a tea spoonful of orange flower water, with a little musk and amber prepared. Put this paste on a table, and roll it with a rolling pin to the thickness of a crown piece. Cut it in the form and size you like, bake it half way, or little more, and take it out. Make a strong icing with the white of an egg, sugar pulverised, and the juice of a lemon, in order to whiten that ice, which thicken as a strong pap by means of the sugar in powder, steep your pieces of cut paste one by one,

one, and set them to dry under the lid of the stove covered with fire, on the top of it.

LII. *The same with cinnamon, or chocolate.*

The meringues, with chocolate, or cinnamon, are made as follows. Pound and sift into subtile powder and distinctly each by itself the cinnamon, and a quantity of the above described paste, after a thorough drying. Then mix these two powders and a discretionable quantity of eggs beaten, continuing to pound the whole till the paste be firm and however flexible. Now spread it with the rolling pin to the thickness you like, and cut it in the shape and form you please, then bake and ice it as usual. If you will not have your meringues too hard, bake them on one side only, and ice them on the other with orange flower-water and sugar. When you dry them, let it be with the lid of the stove, and take care not to make the fire too strong, lest it should blow the ice. When properly dried, the ice is as clear and transparent as real glass.

Note. With the chocolate the same process is to be observed as with the cinnamon.

LIII. *Another way of icing.*

For the sake of them who in the time of Lent have some scruple to eat messes wherein there enters any thing belonging to eggs, you may contrive the following method of icing. Take some gum adragant, which put into a glass tumbler with a little common water and orange-flower ditto. When perfectly dissolved, strain it through a cloth, and use it instead of whites of eggs for pounding your paste in the mortar as above directed. Then for the last icing, use orange flower-water and sugar, pulverised as above.

LIV. *To make gimblettes.*

Suppose you take one quarter of a pound of flour, then one ounce and a half of sugar in powder, will be quite sufficient

sufficient with two or three yolks of eggs and one white only, then a little orange flower-water, with a very little quantity of musk and amber prepared. Knead all together, so as to make a stiff dough with it ; to obtain which you discretionally increase the quantity of flour if necessary. But should it become so stiff that you could not manage it to put in rings, then you must put in the mortar, and soften it with a few strokes of the pestle and a little orange flower. Then spin it in rings ; which when made, throw into boiling water and give a bubble or two ; and afterwards dress it on sheets of paper, and bake it till it is dry.

LV. *To make biscotins.*

Boil one pound of sugar to a syrup *a la plume* ; then throw in half a pound of flour. Stir quickly all together to make a dough, after having previously taken the pan off from the fire, then take this paste out of the pan and dress it on a table, covered with pulverised sugar. Knead it quickly, and pound it next in a mortar with the white of an egg, a little musk and amber prepared, and orange flower-water. When it is thus kneaded and pounded pretty stiff, make it into small balls of the size of a small apricot stone, then throw them into a pan filled with boiling water. First they fall to the bottom : but as soon as they rise on the top, you must skim them out of this water, and put them a-draining in a sieve. Then range them on a sheet of paper, and place them in the oven to bake and make them take a fine colour.

Note. If, when baked, you find any difficulty in taking them out of the paper, wet a napkin and wring it, then set the sheet of paper on it, soon after they will easily come off.

LVI. *To make lemon lozenges.*

Take two whites of eggs, which beat with some orange flower-water. Then add as much pulverised sugar as they will soak up, to make a pretty stiff paste. Introduce also the raspings of lemon peels. All being well incorporated, roll it all into small balls of the bigness

ness of your thumb, which range on a sheet of paper and flatten afterwards a little, then put them into the oven to bake.

LVII. How to preserve orange peels all the year, but especially in May.

Cut some oranges in four quarters and peel them. Then put the peels to soak in water for about ten or twelve days: then dry them between two cloths, and put them in a caldron with a sufficient quantity of honey to half cover them. Boil them thus one minute or two, stirring them incessantly. Then take them off the fire, and let them rest till the next day, put them on again, and let boil ten minutes or a quarter of an hour. For six or seven days repeat the same operation, taking great care incessantly to stir, turn them all the while they are on the fire. On the eighth day change the honey; and in the fresh honey boil them five minutes, then pot them with that new honey in which they boiled last, and keep them for use, after having added some cinnamon, cloves and white ginger, mixed and both reduced into subtile powder.

LVIII. To make a paste with whatever fruit it may be.

Take whatever quantity you please of any fruit, which peel and boil well in water, then strain the juice through a sieve, or a flannel. Now weigh ten pounds of that paste of fruit, and ten more of sugar pulverised. Mix first five pounds of sugar with ten pounds of fruit, and put it a doing on the fire, then mix four more pounds of your sugar. When done, put with a spoon (on iron plates previously powdered with some of the sugar which was left) some of that paste. Set these to dry on a chafing-dish, in the sun, or in the open air, turning and re-turning them often, and powdering them morning and evening with sugar. When these little cakes are perfectly dry, put them in Dutch deal boxes and in white papers, that they may not touch each other.

Note. In the same manner you may make the conserve of roses, bugloss, burrage, red currants, &c.

LIX. *The Genoa paste.*

Take equal quantities of quinces and odoring apple pulp. The pulp is prepared thus: peel these fruits, and clear them of their kernels. Then pound them in a mortar with rose water, and strain them through a sieve. Put the paste on the fire to dry by degrees, stirring it all the while with a wooden spatula. Then add as much sugar in powder as you have pulp, and go on in doing it, till it has acquired the consistence of a paste.

LX. *Quinces jam, and other fruits.*

Boil in a sufficient quantity of water, both the flesh and the peelings of your fruits to perfect softness. Then let the decoction clarify in the sun, when settled, decant it, and adding to the liquor the proper quantity of sugar, boil it to a jelly.

LXI. *Genoa biscuits.*

Take four ounces of sugar in powder, one pound of flour, a little coriander and aniseeds in powder, which mix with four eggs and as much luke warm water as needs to make a dough of the whole. Bake it in the oven; and when baked, cut it in five or six slices, which you bake again.

LXII. *The queens cakes or biscuits.*

Take twelve ounces of flour, one pound of fine sugar in powder, and twelve eggs, from which take out three yolks, with coriander and aniseeds. Beat and mix all together, till it comes to a thick but running paste. Some add yeast to make it lighter and rise higher. Divide this paste into several paper cases, of the width of two fingers, and twice as long, which put in an oven to bake: but take care that it be not too warm.

LXIII. *Macaroons.*

Pound well one pound of sweet almonds, moistening them with rose water. Introduce one pound of sugar, and

and beat all well in a soft paste, which put round a dish, and half bake in a lukewarm oven. When the paste is half done, cut it in small round pieces, and having ranged them on a sheet of paper, finish baking them.

LXIV. Particular method of making cakes.

Wash and clean well a dozen of eggs, and wipe them thoroughly dry. Then break them and take their whites only, which beat in a mortar along with their shells till these latter be perfectly dissolved. Now add sugar and flour, though not so much flour as sugar. When all is well mixed, spread the paste, which ought to be a little firm, on a sheet of paper; and after having glazed it, bake it in a slow oven.

LXV. A cream which cuts as a rice pudding.

Beat in a dish two whites of eggs and one yolk, in which, while you beat, introduce by degrees one quarter of a pound of sugar in proportion as it melts, and a pap spoonful of rose water. When that is compleated, pour in the dish, and stir, a quart of milk and cream mixed half and half, then set it gently on warm cinders to take without boiling, not disturbing it any more. In one hour's time it generally is sufficiently taken. Then colour it in passing a red hot shovel over it. It is to be served cold, after having rasped some sugar on it.

LXVI. To make an exceeding good boiled cream.

Take cream from the cow, which boil with a crumb of stale bread, rasped very fine, and a little fresh butter. As soon as it begins to quake, stir it continually with a spoon; and having diluted some yolks of eggs, strain them through a cloth. Put as much salt and sugar in your cream as you think it may require. And when it boils and begins to rise, pour the yolks of eggs in, never ceasing to stir it in order to prevent its rising so far as to run over. As soon as you see it begins to render the butter, take it out of the fire; and to serve it, glaze it over with sugar in powder.

LXVII. *To make whipped cream.*

Take one quart of good sweet cream, in which add one or two spoonfuls of orange flower-water, and a quarter of a pound of sugar pulverised very fine. Whip it with a handful of fine white and dry willow twigs tied together on purpose. In proportion as it comes to a froth, take it and put in a bowl, or dishes, to serve it on the table.

§ II. Of Summer compottes, or stewed fruits.

LXVIII. *The raspberries compotte.*

Boil half a pound of sugar into a syrup to *a-la-plume* degree, in which throw one pound of raspberries well picked, clean and whole. Take the pan off from the fire, and let all rest. A little while after, shake the pan gently in which the fruit is, and stir it a little, then set it again on the fire to boil five minutes; after which, take it off again and let it cool. Forget not to skim the fruit well when in the pan. Currants admit of the very same preparation, and by the same process.

LXIX. *The apricots compotte.*

Make a lye with pearl ashes; and when that lye shall have boiled five or six minutes, put in about a quart of green apricots, which stir in gently with the skimmer; then take them out and throw them into cold water. Clean them well one by one of all their down, and throw them, as you go on, into another cold water. Then boil some water in a preserving pan, and put them into blanch, till you can thrust a pin into them easily. When this is the case, pour them all in a sieve, and let them strain. Then clarify a pint of syrup; and when it boils, put in the apricots and boil them gently in that sugar for ten minutes. Then take them out, stir and skim them; let cool and serve.

LXX. *To*

LXX. *To make a compotte of fruits as above, and even plums broiled.*

Take any quantity of either peaches, plums, or apricots; broil them on all sides over a chafing-dish of bright and live coals. Peel them next as fast as you can, and put them on a silver plate with one handful or two of sugar pulverised, and sufficient water only to help melting the sugar. Set them next on the fire and boil them one minute or two, then take them out and let cool. When you are ready to serve them, squeeze the juice of a lemon, or orange, over them.

LXXI. *To make a compotte of perdrigon plums.*

Take off the skin of about two pounds of perdrigon plums, which throw in the mean while into cold water, then strain it out and put into boiling one for about two or three minutes only, after which having taken them out of this water and drained, range them in three quarters of a pound of sugar boiled into a pretty strong syrup. When they have boiled eight or ten minutes in it, skim them, let cool them and serve.

Note. The lit-de-verd-plums are made in the same way. Whenever a plum is not ripe enough, you may let it do a little longer in the water in which they are boiled previous to the syrup, taking care however they should not come to mash in it.

LXXII. *The same for mirabelles, purple and black damask Sainte-Catherine and other plums.*

Take any quantity of the abovementioned plums, we suppose two pounds. Pass them in the boiling water without peeling them, especially the mirabelles, then put them in a syrup of half a pound of sugar, and finish them like the perdrigons.

LXXIII. *Compotes of verjus in grain.*

Take a pound or two of verjus in grain and the finest you can find; stone it carefully with the point of a tooth-

pick, and throw it in the mean while into cold water. When all is done, take it out with a skimmer, and put it into boiling water. Then take it out from the fire, and let it cool. Skim it out again and put it in a syrup of one pound of sugar, in which boil it gently over a slow fire; and when the *verjus* begins to turn green, finish it quickly like the other *compottes*, but take great care not to do the syrup too much.

LXXIV. *Compottes of peeled verjus.*

Take the skin and the stones out of two pounds of *verjus*, and put it in a bowl, in proportion as you do it. Then clarify one pound of sugar, which boil into a syrup to *a-la-plume* degree, and put in the peeled *verjus*, which boil also till you find it sufficiently done. Take care not to do it too much in syrup for fear it should turn black.

Note. *Muscadine* grapes may be done just in the same manner.

LXXV. *Compottes of early pears called muscat.*

Peel two pounds of those pears, scrape their tails, and cut off the end of them. As you prepare them, throw them into cold water. When done, take them out and drain them. Then put them in boiling water, and, when they are softened and almost done, take them out of that water to put them into cold again. When they have been there a while, take them out to drain, and put them afterwards in one pound of sugar boiling, leave them till the syrup be almost compleated: then remove the pan from the fire, stir and skim them. Add the juice of half a lemon; then let cool and serve them.

Prepare in the some manner the sorts of pears called *Rousselet*, *Martin-sec*, *Jargonelle*, and *Blanquettes*. But as they are larger than the *muscat*, you may blanch them, that is to say, boil them in water, before peeling. As for the rest, there is no sort of difference in the process of making *compottes* of them.

LXXVI. *The compotte of the largest sorts of pears, such as Beurre, Mesire-jean, Bergamotte, Vertelongue, Bzidery, Mouille-bouche, Amadotte, Doublefleur, Bonchretien-d'hyver, Franc-real, &c. &c.*

Boil in water any quantity of the above-mentioned pears, till they are done. Then peel them, core them, and throw them into cold water. Now melt a quantity of sugar proportionable to that of your pears, in which you put them and boil to a syrup, as for the other sorts of compottes. When done, take them from the fire, and skim them well. Squeeze over the juice of half a lemon, and serve them either warm or cold, as you like.

LXXVII. *A compotte of pears a-la-braise.*

To do this proceed as follows. Broil your pears over a chafingdish of bright and live coals: and when sufficiently done, place them a moment on the naked coals, that you may peel them the more easy and to colour them. Then peel and core them, and put them in a weak syrup, in which boil them a little while, but not too much.

LXXVIII. *A compotte of apples a-la-bouillone.*

Cut a few apples into halves and core them. Range them in the pan, and for the quantity of six or eight apples, put one pint of water and a quarter of a pound of sugar. Cover them over and set them on the fire to boil; when the liquor is almost all wasted, dress them on a dish and serve them.

N. B. The compottes of *calvill*-apples are made in the same way.

C H A P. XV.

SECRETS relative to the Art of PREPARING
SNUFF.I. *How to reduce tobacco into powder.*

UNCORD the tobacco, and spread the leaves to dry in the sun. Then pound them in a mortar, and sift through a coarse sieve to get the coarsest powder out of it. As for sifting, observe to do it in due proportion as you pound it, and not to pound much at a time. You may also take another method, that of grinding it in one of those small mills which are made on purpose for grinding tobacco. By these means you may, without much trouble, make it as coarse and as fine as you like, by screwing tighter or slackner the nut.

II. *How to purge snuff, and prepare it for admitting of odours.*

Have a small tub pierced with a hole at bottom, which you may stop and unstop with a cork as you want it. In this tub put a very thick and close weaved cloth, which turn over the rim of the tub and fix there by the outside. Put your snuff in it, and pour water over it. After it has soaked thus twenty-four hours, unstop the hole of the tub and let the water drain away, wringing the cloth in which it is to help the expression of the water. Repeat this operation three different times to purge it the better. When this operation is performed, set the snuff to drying in the sun. When dry, put it again in the tub in the same manner as before, and soak it again, not with common water, but with some smelling ones, such as for example, orange flower water, *eau-d'ange*, &c. Twenty-four hours after let the water run off and drain, then set it

it in the sun to dry as before. In the mean while stir and asp ~~use~~ it again with smelling water. Such is the indispensible preparation absolutely requisite to dispose snuff to receive the odour of flowers. If you do not care to have it so perfectly nice, and should not like to waste so much of it, you may give it but one wash of the common water. This moderate purgation will do pretty well, especially if, while it is a drying in the sun, you knead it the more often in proportion with your fragrant waters, and let it dry each time between.

III. *How to perfume snuff with flowers.*

The tuberoſe, the jefſamine, the orange flowers, &c. and thoſe which communicate the more eaſily their fragrance to the snuff. To produce this, have a box lined with white paper perfectly dry, in which make a bed of snuff of the thickness of an inch, then one of flowers, another of snuff, and another of flowers again, continuing ſo to do till you have employed all your snuff. After having let this ſtratification ſubſift for twenty-four hours, ſeparate the flowers from the snuff by means of the fieve, and renew the ſame ſtratification again as before with new flowers. Continue thus to do till you find that your snuff has acquired a ſufficient fragrance from the flowers: then put it in lead boxes to keep it.

IV. *Another way to do the ſame.*

Incloſe their flowers between ſheets of white paper filled with pin-holes as thick as poſſible; this bed lay between two of snuff; and, as for the ſmall quantity which may have got in the papers through theſe holes, ſift it out by means of a ſlicer horse-hair ſieve. The flowers muſt be renewed four or five times. This method ſeems the leſs troubleſome, and the snuff catches the odour nearly as well.

V. *Another method.*

A preparation of snuff may be made of an exceſſive
O6 nice

nice fragrancy with buds of roses. The process is this. Rub those buds of their green cup and the pistillum which is in the middle, instead of which, skilfully introduce a clove without damaging and breaking or loosening the rose-leaves, which are closely wrapped up one in another. Such buds, thus prepared, put into a glass vessel well covered over with a bladder and a leather besides, and expose them for a month in the sun, after which term make use of these buds as before-directed for the other flowers.

VI. *Snuff of mille-fleurs.*

The *mille-fleurs*, or snuff of one thousand and one flowers, is made by mixing together a number of various odoring flowers, managing the quantity of each of them according to the greater or lesser degree of fragrancy they are empowered with, so that none could be found to have a predominancy over the others. When that is executed, you proceed, as before directed, to the alternate stratification of this mixture and of the snuff powder.

VII. *The odoring snuff after the method practised at Rome.*

Take the snuff after its being perfumed with flowers, and put it in a large bowl or other proper vessel. Pour over it some white wine, with an addition of essences of musk and amber, or any other such like odours. Then stir your snuff and rub it all between your hands. In this manner you may have snuff of whatever odour you desire, which, to distinguish from each other, you put into separate lead boxes with a particular mark.

VIII. *The snuff with the odour of civet.*

Take a little civet in your hand with a little snuff; spread that civet, more and more in bruising with your fingers, and an addition of snuff. After having mixed and remixed it thus in your hand with the whole quantity of snuff, put all again together in its box as before. You may do the same with respect to other odours.

IX. *Amber-snuff.*

Heat the bottom of a mortar, and pound in it twenty grains of amber, adding by degrees one pound of snuff to it, which rub and mix afterwards with your hands, to introduce the odour the better among it.

X. *The odoring snuff, Maltese fashion.*

Take a snuff ready prepared with orange flower-water (as directed art. ii.) then perfume it with amber as we have just said ; after which with ten grains of civet, pound with a little sugar in a mortar, introduce again your snuff, by degrees, to the quantity of one pound for these ten grains, increasing either the snuff or the odours in the same proportion to each other.

XI. *The true Maltese method of preparing snuff.*

Take rose tree and liquorice roots, which peel, and reduce them into powder and sift it ; then give it what odour you like, adding white wine, brandy, or spirit of wine, and mix your snuff well with this. Such is the true Maltese method of preparing snuff.

XII. *The Spanish method of preparing perfumed snuff.*

1. Pound in a small mortar twenty grains of musk with a little sugar. Add by degrees as much as one pound of snuff to it : then pound ten grains of civet, and introduce your pound of musked snuff to it in a gradual manner as before, and rub all together between your hands.

2. The Seville-snuff is the same with only an addition of twenty grains of *vanilla*, an ingredient which enters in the composition of chocolate.

3. They who are fond of a milder and sweeter odour in their snuff may increase the quantity of snuff for the prescribed doses of odours, or diminish the doses of odours prescribed for the quantity of snuff. You must take great care not to let odoring snuff be uncovered in the air, but to keep it very close for fear it should lose its fragrancy.

4. As the Spanish snuff is excessively fine and drawing towards

towards a reddish hue, to imitate it in the above prescription you must chuse fine Holland well purged, reddened and granulated, pound and sift it through a very fine silk sieve. Then give it whatever odour you like, after having purged it in the manner we prescribed in this chapter, art. ii.

5. There is no inconveniency in taking a snuff already prepared with flowers, to give it afterwards, when you like, an odour of musk, amber or other perfume. On the contrary, such a snuff is the readier to take the other odours, and preserve them so much the longer.

XIII. *To give a red or yellow-colour to snuff.*

Take the bulk of a nut of red or yellow ochre, with which mix a little white chalk to temperate the above colours at your pleasure. Grind either of these ochres with three drachms of oil of almonds; then, continuing to grind it on the stone, add by little at a time some water to it till you see the paste admits of it freely and becomes very smooth and equal. Now take some gum adragant water, and introduce it likewise to the above paste, stirring continually. At last gather it in a large glazed bowl, and dilute it in about one quart of common water, or thereabouts. Then take your snuff well purged and prepared as in art. ii. and throw it in this bowl, wherein handle and rub it well to make it take the colour more regularly and equally. When it is thus made all into a lump, let it rest twenty-four hours before putting it to dry in the sun, which immediately after spreading it on a dry cloth and turning it now and then to help its drying the faster. Then gum it again by aspersion with gum adragant pulverised and dissolved into some smelling water: or you may again dip your hands into that water, and rub your snuff between your hands thus wetted; which last method is preferable, as it gums the snuff infinitely more regular. Lastly, dry it again in the sun; and, when perfectly dry, sift it through the finest sieve you can find, and then it will be ready to admit of whatever odour you please to impregnate it with.

C H A P. XVI.

SECRETS of taking out SPOTS and STAINS.

I. *To take off iron-molds from linen.*

PUT boiling water into a bowl, and spread the stained parts of your linen over it, as to be well penetrated with the steam of the water. Then rub the places with forrel juice and salt till they are perfectly soaked. Such linen washed afterwards in the lye of wood-ashes, will be found to return intirely free from the iron-mold spots it had before.

II. *To take off carriage wheel grease from clothes.*

Rub the place with butter. Then with blotting paper and a hot iron, you may take all off as you would a drop of wax or tallow on a cloth.

III. *Against piss spots.*

Boil some chamber-lye and wash the place with it. Then rinse it with clear water.

IV. *To take off spots from cloth of any colour.*

Take half a pound of crude honey, the yolk of a new laid egg, and the bulk of a nut of ammoniac salt. Mix all together, and put some on the spots. After having left it there a while, wash the place with clean water, and the spot will disappear.

V. *A receipt against all sorts of spots, upon stuff.*

A water impregnated with alkaline salt, black soap and

and bullock's gall, take off extremely well the greasy spots from any cloth or silk stuff.

VI. *Against oil-spots.*

Take a piece of white soap, shaved very fine, and put in a quart bottle with a wide mouth and neck, half filled with lye. Add to this the bulk of a nut of ammoniac salt, two yolks of eggs, cabbage juice and bullock's gall a discretionable quantity, one ounce of salt of tartar in subtile powder sifted. Stop the bottle well, shake it and expose it to the sun for four days. After that time, if you pour off that liquor on any oil spot, and rub it well with it in and outside, then let it dry, and wash it again with clear water.

VII. *A washing ball to take off spots.*

Take fuller's earth, or soft soap incorporated with vine brush ashes, white chalk, alum and tartar, pounded all together in a mortar and sifted through a fine silk sieve. When all is made into a pate, form your balls with it, and let them dry in the shade. To use them, rub any spotted place with it, and wash it afterwards with clear water.

VIII. *To take out pitch and turpentine spots.*

Rub well the spot with oil of olive, which set to dry for one day. Then, with warm water and the above washing ball, you will intirely ungrease the place.

IX. *Against ink spots, whether on cloth or linen.*

Wet immediately the place with lemon, or forrel juice, or with white soap diluted in vinegar.

X. *Another simple remedy against ink when just spilled.*

The time spent in lamenting over an accident just happened, is but too often the only one which could have saved

fixed and prevented the dire consequences of it, nay perhaps repaired it intirely without leaving the least scar behind, had we ran instantly to the remedy. If the ink be spilled on a ruffle or apron, &c. while you have it on, let one hold the affected part between his two hands over a basin, and rub it while another is pouring gradually water from a decanter; and let a whole pitcher full be used if necessary. If the ruffle, apron, &c. be at liberty and not actually worn on, the place dipped into a basin filled with water, and there squeezed and dipped in again, may do, provided you change the water in abundance, every two or three squeezes. If the ink be spilled on a green carpet table, it may immediately be taken out with a tea spoon so dexterously that any water at all shall hardly be wanted afterwards, provided it was only that instant spilled; as the down of the cloth prevents the immediate soaking of the ink or any other liquor (except oil) but if it has laid some time, let the time be ever so long, provided it is still wet, by pouring a little fresh clean water at a time on the place, and gathering it up each time with a spoon, and pressing hard to squeeze it out of the cloth into the spoon again, you will at last bring it to its natural colour, as if no such accident had ever happened.

XI. *Against oil spots on satin, silk stuffs, or paper.*

If the spot is fresh done, heat on the shovel some ashes from calcined sheep's trotters, and put some under and upon the place. Then laying something heavy upon it, let it remain for one night; the next morning the spot ought to be gone; but if not quite, renew the precept.

XII. *A preparation of balls against spots.*

Take half a pound of soap, four ounces of clay, and one of quick lime. Dilute all with a little water, and make it into pills or small balls. With these rub the spots, and wash the place afterwards.

XIII. *For silks.*

If you rub the spots which are upon a silk with spirit of turpentine, they will disappear; because the volatility of

of that spirit exhaling into vapour, carries along with it the oil of the spot to which, on account of its homogeneous quality, it communicates its volatility, by penetrating and subdividing it infinitely.

XIV. To restore gold and silver laces to their former beauty.

Mix equal quantities of water, bullock's and jack's gall. With this composition rub your gold or silver, and you will see it changing colour directly.

XV. To restore Turkey carpets to their first bloom.

Beat the carpet well first with a rod, till perfectly free from dust. Then if there be any spots of ink, take them out with a lemon, or with sorrel; and wash the place afterwards with clear water. Shake the rest of the water off, and let it dry, rub the carpet very hard all over with the smoaking hot crum of a white loaf: and when you find in the evening the skies clear, and a likelihood of being a fine night, let the carpet be put out for two or three such nights.

XVI. To make tapestries resume their first brightness, when their colours have been tarnished and spoiled.

Shake and clean well the tapestry by rubbing it all over with white chalk, which leave on it for about one day. Next with a rough hair brush, get all that chalk out again, and put on fresh, which leave as before. Then with the same rough hair brush get this out also, and beat it soundly with a rod, and brush it afterwards with the soft cloth-brush. This operation will restore a tapestry to its pristine state.

XVII. To take off spots of wax from velvet of any colour, except the crimson.

Take the crumb of a stale loaf, and cut a thick slice out of it, which toast, and apply, while burning hot, on the spot of wax; when cooled, renew it till all the wax is soaked out of the velvet.

XVIII. To

XVIII. *To take the same from silks and cramblet.*

Put on each wax spot, some soft soap, and set it in the sun till grown warm; then by washing the place with clean water, the spot will disappear.

XIX. *To wash a gold or silver, or silk embroidery, or any stuff whatever, and render it like new.*

Take bullock's gall, one pound; soap and honey, three ounces of each; and Florentine orrice, about the same quantity in subtle powder. Put all in a glaſs vessel, in which mix it well, into a paste, and let it be exposed for ten days in the sun. When you are ready to use it, make an infusion of bran, which boil in water and strain through a cloth. Then smear the work over with the above-described paste, in such places as you want to clean, and wash them afterwards with the said bran water, renewing this till it receives no more alteration in its colour. Wipe then well the places with a white cloth; and wrap the work in a clean napkin to set it in the sun to dry, after which pass it through the polishing and lustring pres, and the work will be as fine and bright as when new.

XX. *To take the spots off from silk and woollen stuffs.*

Take French starch, without any mixture of indigo or blue whatever, which dilute in a cup with good brandy like a thick pap. Of this paste, put on each spot, and when dry, rub it off and brush it. If the spot is not quite gone at the first time, renew the operation, and it certainly will at the second.

XXI. *To colour velvet in red.*

Take four ounces of adragant, and one of arabic gums, both of which pulverise. Put this powder in clean water, wherein let it dissolve for two or three days. After which time, steep a sponge in the liquor, and rub the wrong side of the velvet. If after being dry, you find it not high-coloured enough, renew it, and the effect will surprise you.

XXII. *To*

XXII. *To revive the colour of a cloth.*

Pour one quart of water on one pound of burnt pot-ashes. Twelve hours after decant the water off in another vessel, and put in a handful of dry moth mullein leaves, with two bullock's galls. Boil all together till the leaves go to the bottom. Then set this water for a few days in the sun. Then putting in it whatever colour you want, boil it along with the cloth in that lye, and let it thus soak afterwards for fourteen or fifteen days, then the cloth will have resumed its primary colour.

XXIII. *To take the spots off from a white cloth.*

Boil two ounces of alum for half an hour, in a pint, or a pint and a half of water; then put in a piece of white soap, with another pound of alum; and having soaked thus three days in the cold, you may with it wash all the spots of any white cloth whatever.

XXIV. *To take off the spots from crimson and other velvets.*

1. Take one pint of lye made of vine branch ashes, in which dissolve half an ounce of alum dregs. When settled, strain it through a cloth; then take another drachm of alum, half a drachm of Spanish, and as much of soft soap; a scruple of common, and half a drachm of ammoniac sa'ts; a calf's gall, and a little calendine juice. All being well mixed, strain and keep it for use.

2. Before using, take the quantity you think to have need of in a cup, in which put a little brazil wood and *bourre d'ecarlatte* (or goat's hair from the dyers, dyed with madder) to boil a bubble or two, then strain through a cloth. In that state, your preparation will be fit to take off all the spots from crimson, either cloth or velvet.

Note. For cloths or velvets of other colours, tinge your liquor with *bourre*, or goat's hair, of the same colour.

XXV. *To take off an oil spot from cloth.*

Take oil of tartar, which put on the spot, then wash it immediately, first with lukewarm water, then with two or three cold waters, and it will be perfectly cleansed.

XXVI. *A composition of soap to take off all sorts of spots.*

1. Take one pound of *Venetian* white soap, six yolks of eggs, and half a spoonful of salt pounded. Incorporate all together with a sufficient quantity of the juice from the leaves of white beet. Make this composition into small cakes, which dry in the shade.

2. To use them, wet the place of the cloth where the spot is, with clear water, and rub it over on both sides with the said soap; then washing it, the spot will disappear.

XXVII. *To take the spots from a white silk or crimson velvet.*

Wet the place well with brandy of three rectifications, or with the very best spirit of wine, then smear it over with the white of an egg, and set it to dry in the sun. When dry, wash the place with clean water, passing and squeezing it between your fingers; and if the spot is not gone at the first operation, it will not fail at the second, therefore renew it again.

C H A P. XVII.

SECRETS Relative to the ART of FISHING,
BIRD-CATCHING, &c.I. *How to entice a great quantity of fish to resort to a certain place.*

YOU may draw all the fish into whatever place you find most commodious, by throwing in the following composition.—Take bullock's, goat's, and sheep's blood, which is found in curds among the entrails in the body

body of the animal fresh killed, thyme, origan, flour, marjoram, garlick, wine lye, and some suet or marrow of these same animals. Pound well all these ingredients together, and make them in small pills, which scatter in that place of the river or pond where you wish to have the fish come.

II. Another receipt to the same purpose.

Pound nettles with *joubarbe*, and some of that grass called *quintefolium*; add some wheat boiled in marjoram, and thyme water well pounded also with the rest. Put of that composition in your net, and it will soon be full.

III. Another way.

Grind together *coculas Indicus*, cumin and some old cheese, make a paste of it with wine lye and wheat flour. When all is well incorporated, make it into pills of the size of a pea. Throw them into a river or pond wherein you know there is a great quantity of fish, in a part where the water is clear and undisturbed. Every fish who shall swallow those pills will be so intoxicated that they will all come to the side of the water, and you will be able to take them with your hand. In a short time afterwards their intoxication will go off, and they will become again as brisk as ever they were before eating that bait.

IV. Another way.

Marjoram, marigolds, wheat flour, and rancid butter, goat's suet, and *lumbrici terreni*, (or earth worms) pounded and mixed all together, are of infinite service to intice all sorts of fish in the net.

V. How to get a good many birds.

Have an owl or chough, which tie in the night to a tree in the forest. Near him place a large lighted candle, which shall blaze very much. Then let two or three people make a noise about the tree with drums. The birds will come in crowds to roost near the owl, to make war against him, and you will thereby have an opportunity

nity to kill numbers of them, by firing in th emidst of them with small shot.

VI. *Another way.*

Put a-soaking some birds seed in good brandy, with a little white hellebore, and place it in some part of your garden as a bait for the birds which frequent it ; and all those who shall eat of that seed will so suddenly be intoxicated by it, that they will suffer themselves to be taken by the hand.

VII. *Another way.*

If you want to catch live swallows or crows, make papers in the form of a sugar loaf, with some strong brown or blue paper, the entrance of which rub in the inside with bird-lime, and bait at the bottom with some stinking piece of meat or carrion to intice them. By these means, when they go to thrust their heads in those papers, to take the meat, the lime catches hold of their feathers, all about their neck and head, and caps them in such a manner that they find themselves blinded, and cannot fly, when they go to rise for it, which gives an opportunity of taking them alive with the hand.

VIII. *Another way.*

Mix a little *nux vomica* among the seed, which lay as a bait for birds. As soon as they shall have eat any of it they will fall into a swoon, and it will be easy to lay hold of them with the hand.

IX. *To preserve and multiply pigeons.*

In a large dovecote, prepare the following food, which will induce your pigeons to love their cote, and also to bring you a great many strangers when they go abroad.—Take thirty pounds of millet, three of cummin, five of honey, half a pound of bishop's-wort, otherwise *costus*, two pounds of *agnus castus* seed, which boil in river water to the total evaporation of the last. Then in its stead

pour

pour a gallon and a half, or two gallons of red Port, with about eight pounds of old mortar well pulverised, which set on the fire again for about half an hour to concoct. Thus all those ingredients will harden and form a lump, which if placed in the middle of the dovecote, will in a short time amply reward you for your expence.

X. *Another for the same purpose.* -

If you hang in your dovecote a couple of the oldest flinking and dry salt cod-fish, you will by this means not only keep your own pigeons safe at home, but also cause a desertion among all those of your neighbours; for the smell of that fish, of which they are excessively fond, will reach them many miles off.

XI. *How to fatten pigeons.*

Experience shews that nothing will keep pigeons in better order, and fatten them sooner, than a paste made of fried beans with cummin and honey.

C H A P. XVIII.

SECRETS, ENTERTAINING AND USEFUL.

I. *To whiten wax.*

MELT it in a pipkin without boiling. Then take a wooden pestle, which steep in the wax two fingers deep, and plunge immediately into cold water to loosen the wax from it, which will come off like sheets of paper. When you have thus got all your wax out of the pipkin, and made into flakes, put it on a clean towel, and expose it in the air on the grass till it is white. Then melt it again, and strain it through a muslin to take all the dirt out of it, if there be any.

II. *Another*

II. Another of whitening wax in large manufactures.

1. Melt your wax in a large copper, such as brewing or washing coppers fixed in mortar; have a kind of trough, made of oak or deal, and six or seven feet long, at the farther end of which a cock of cold water will be placed in the wall to fill it, and at the other, towards the copper, a tub laid upon it, to receive the wax from the copper. Let that tub have also a cock at four fingers breadth from the bottom, and in that tub pour the melted hot wax from the copper. Cover it with a blanket in four doublets to make it retain its heat, and let it rest thus a couple of hours to give time to the dirt and nastiness, which may happen to be in it, to settle at the bottom of the tub. When that is done, fill your trough with cold water; then have a kind of tin basket to fit the width of the trough so as to sit upon its edges, and bored at bottom with twelve or sixteen small holes, at equal distances, so as to receive the melted wax from the cock of the tub, and render it in the trough through the said small holes of its bottom, while with a polished wooden stick or roller, under the tub, and armed at both ends with iron in the form of a spit, and half of the thickness of which enters into the water, while the other keeps above it, you keep continually turning equally and regularly. This process will make the wax flake in the water into small ribbons as thin as silver paper. Now in fine clean hampers, or hand baskets, made of white peeled willow twigs, take your wax from the trough with a wooden shovel, and carry it to an open field, where lay it thick upon a coarse cloth in the sun, and turn it every other day for two weeks running, after which time it will be of a very perfect whiteness.

2. Now clean well your copper, and put in alum water to warm, in which throw your whitened wax, and stir well. When melted, renew the operation as before, and carry it again in the open field to expose it in the sun. In a week's time it will have its whiteness in the highest degree it can be carried to.

3. Melt it then for the last time, and put in small round

round cakes, which is done by casting it in small moulds carved purposelly on several boards.

III. *How to multiply wax.*

Take bullock's suet, which pound well, and put a soaking for seventy-two hours, in the strongest French wine-vinegar, then boil afterwards for forty-eight hours, keeping perpetually skimming, as long as there appears any scum upon it. When that is done, let it cool a while, and throw it afterwards into a tub of cold water, wherein beat and stir it till it resumes its wonted consistence and firmness. Then put it again into other fresh vinegar, and repeat the very same process three different times. Next to that, gather the tops of rosemary, sage, bay, and mint, which pound and boil well in water, then strain through a double flannel bag. In this water boil for the last time your prepared suet as before, and after it shall have boiled there one hour, it will have no more bad smell. To colour it you must put one drachm of saffron to each pound of suet, and melt it afterwards with an equal quantity of real bees wax, then it will be impossible to discover the mixture.

IV. *To make mutton suet candles, in imitation of wax candles.*

1. Throw quick lime in melted mutton suet; the lime will fall to the bottom, and carry along with it all the nastiness of the suet, so as to leave it as pure and fine as wax itself.

2. Now if with one part of that suet, you mix three of real wax, you will never be able to find out the mixture, not even in the moulding and casting wax for figures or ornaments.

V. *To make soap.*

The white, or as it is called, the *Geno* soap, is made with wood ashes, *Alicant* kali, lime and olive oil. The black is made of the same materials, with this exception, that

that it is made with the *faeces* and tartar of the oils. The marble is made with *Alicant kali*, *bourde*, and lime; and when it is almost done, they take some red earth, which they call cinnabar, with copperas; they boil these together, and throw it in the copper wherein the soap is. It occasions a blue marbling, as long as the copperas keeps the better of the two ingredients; but as soon as the cinnabar has at last absorbed the vitriol, this blue hue subsides intirely, and the red alone predominates.— In order therefore to form the soap, make different lyes with all these sorts of matters; and when they are sufficiently charged (which beginners know by their carrying an egg swimming, without its sinking to the bottom, and experienced soap-boilers are judges of by dejustation, and the time they have been at work) they put all these lyes in proper coppers, and pour at the same time in *Provence* and *Languedoc*, oil of olive; in *Germany*, grease: and in *England*, oil of fish. That done, they boil all together with a great blasting fire; and eighteen or twenty days afterwards these oils have so well aspired all the salts of the lye, that this is left quite flat and untasty. Then by the cocks which are at the bottom of the coppers, the water or lye is let out, and the lump of soap taken out and placed to dry in houses built on purpose, to make it take a sufficient consistence.

VI. To prevent any thing from burning in the fire.

Pound into powder cherry-tree gum and alum in equal quantities, and imbibe that powder with strong wine-vinegar, which leave thus a digesting on warm ashes, for the space of twenty-four hours. If with this composition you rub any thing and throw it in the fire, it will not be consumed by it.

VII. To prevent burning one's fingers in melted lead.

Take two ounces of *bol armeniam*, one of quick silver, half a one of camphire, and two of brandy. Mix all together with a pestle in a brass mortar, and rub your hands with this composition, before steeping them into

a pot of melted lead, and this will have no effect upon them.

VIII. *A fire which cannot be extinguished by water.*

Take five ounces of gun-powder; saltpetre, three; brimstone, two; camphire, rosin, and turpentine, one of each. Mix all together, and imbibe it with rectified oil of rosy fir-tree. If you fill balls with this composition, and throw them thirty feet deep in the water, they will burn still, even if you cover them intirely with mould.

IX. *To prevent the oil of a lamp from smoking.*

Distil some onions, and put of the distilled liquor at the bottom of the lamp, and the oil over it, then you will see the oil give no offensive smoke.

X. *To make an incombustible wick.*

Take a long piece of feathered alum, which cut of what size you like, and bore in its length several holes with a large needle; then put this wick in the lamp; the oil will ascend through these holes, and if you light it, you will see the effect of it.

XI. *A stone which is inflammable with water.*

Take quick-lime, refined saltpetre, Alexandrian tutty, and calamina y stone, in equal quantities, with brimstone and camphire, of each two parts. Put all into subtle powder, and sift it through the finest sieve. Then put all into a new piece of cloth, and tie it very tight. Put this knot into a crucible, which cover with another crucible, and lute well with greasy clay. Let the lute and all be set in the sun, or over a baker's oven, to dry. After which time place these crucibles in a brick kiln, and do not take them out before the bricks are baked. Then you will find a stone, which the least drop of water will inflame, so as to light a match if you put it to it. To put it out, only blow upon it.

XII. *To make the true phosphorus, extracted from urine, which is inflammable by the air, so that pieces of wood may be lighted by it.*

Put a large quantity of chamber lye in bottles, set them in the sun during the dog-days, till the urine become entirely fetid. In proportion as the urine diminishes by the evaporation the heat occasions, let them be filled again by pouring from the one into the other, but not by any fresh urine. When it is come to its utmost degree of corruption, put it into a glass retort on a sand bath; and, having luted a bladder for receiver, there will arise first a spirit, and next a phlegm. When the distillation is ended, and you see that nothing more arises, let the retort cool, and unlute it to fill it again with urine of the same degree of corruption as the last. Lute and distil again as you did before, first the spirit, and then the phlegm, continuing to unlute, fill again and distil till you find you have got at the bottom of the retort a good quantity of *fæces*.— Observe and be very careful at every distillation not to force the distillation beyond the phlegm. But when it comes for the last time, re-adapt the bladder, and give the gradual rising fire till the oil ascends, in which case, keep up your fire to that degree, and when you see it stops, then is the time to increase your fire, to force out any thing which can be forced and distilled from it. When that is done, let the retort cool, and break it. Therein you will find two sorts of matters; the one rare and spungy, which occupies the upper part, and another under, very nasty and tartareous. Separate carefully, and dexterously, with a wooden knife, or spatula, the uppermost matter from the undermost. Put the spongy one in a new retort, and give a gradual fire on the sand bath. The first which arises will be an oil, which put aside; the next will be a matter not unlike melted sulphur. Then take the oil which first ascended, and mix it with that of the preceding distillation, which pour all together on the residue of this second one, and set it on a very slow fire, to exhaust gently all the humidity from it. Then empty this humidity or phlegm out of the receiver,

and replace it with clear and clean water ; and, having re-adapted it to the retort, distil all your greasy and bituminous oil ; it will come out like stars and spangles of fire, which will fall into the receiver. But then is the time to take care and not be too hasty by pushing the fire too hard, for you would cause the breaking of the retort, and lose at once all the fruit of your labour.—The operation being therefore well conducted throughout, you will find your matter at the bottom of the receiver : break it into several pieces, put it in a phial with water, and cork it well. Such is the process to be observed in making the *phosphorus* from urine, and which we here publish from experience.

XIII. *Fruit.*

To preserve trees from being injured by worms, caterpillars, &c. Clear away the gum that issues out of the tree affected by the worm ; strew a little flour of brimstone around the root, and cover it with fine mould, that it may not be blown away, yet so that the sun may operate through and cause the brimstone to fumigate, which will destroy the worm. One pound of brimstone is sufficient for near two hundred trees. The same kind of sulphur is destructive to caterpillars. Split the end of a pole or stick, put therein a few brimstone matches, set them on fire, and hold the pole under the nest.

XIV. *To kill all sorts of worms in cattle.*

Take *saven*, chop it small, and beat it with fresh butter, make it in small balls, and give it to the beast in a proportionable quantity. Sweet wort and a little black soap mixed together as a drink, maketh all sorts of beasts void the worms.

XV. *To kill maggots in sheep.*

Take goose grease, tar and brimstone, mix them together on the fire, and when cold, anoint the troubled places therewith.

INDEX.

CHAP. I.

Of the Art of Engraving.

Art.		Page
1.	A Wax to lay on iron or steel	1
2.	A mordant water to engrave on steel	1
3.	To engrave with <i>aquafortis</i> , so that the work may appear like a <i>basso-relievo</i>	2
4.	<i>Aquafortis</i> for engraving	2
5.	To engrave on brass, or copper, with <i>aqua-</i> <i>fortis</i>	3
6.	To engrave prints by <i>aquafortis</i>	4
7.	Another	4
8.	The method of engraving with <i>aquafortis</i>	4
9.	To engrave on wood	5
10.	To engrave on copper with the graver	7
11.	To engrave on steel, or iron, such as blades of swords, knives, &c.	8
12.	A water to engrave on iron or copper	8
13.	Another more mordant water	9
14.	An ardent water to engrave steel deeply, or even eat it off entirely	10

CHAP. II.

Of Metals.

1.	Transmutation of iron into the finest German steel	11
2.	To make tin	11
3.	To break an iron bar as big as the arm	12
4.	Another for the same purpose	12
5.	To compose a metal of a gold colour	12
	P 4	
	6. Another	

Art.	Page
6. Another composition of metal	13
7. To dissolve gold in your naked hand	13
8. How to give some perfection to imperfect metals	13
9. To melt all sorts of metals in the shell of a nut, without burning it	15
10. To increase the virtue of a loadstone	15
11. To restore gold to its weight, after it has lost it in regal water	15
12. To operate the transmutation of silver into gold	15
13. Fixation of gold into silver	16
14. To extract mercury from lead	17
15. Another mercury from lead	18
16. Permutation of lead into silver	18
17. Fixation of saltpetre	18
18. The mutation of iron into copper	18
19. Another to the same purpose	19
20. Another	19
21. To preserve the brightness of arms	19
22. To manage steel so that it may cut iron as it were lead	19
23. To soften steel	20
24. To extract mercury from antimony	20
25. A magical mercurial ring	20
26. To melt the aforesaid mercury	21
27. The virtue of those rings	21
28. A fixation of copper which will be found to yield six ounces out of eight, on the test	22
29. To whiten copper so as to make very fine figures with it	22
30. To give the finest colour of gold to copper, in order to make statues, or other works, with it	22
31. To imitate tortoiseshell on copper	22
32. To perform the same on horn	23
33. To soften metals	23
34. To wash brass figures over with silver	23
35. To operate the transmutation of iron into steel	23
36. Another receipt for the same	24
37. To take immediately rust from iron	25
38. To obtain good silver from pewter	26
39. To soften iron	26
40. To	

Art.	Page
40. To melt iron so that it will spread under the hammer	26
41. To give iron a temper to cut porphyry	27
42. To soften all sorts of metals	27
43. To soften a sophistic metal	27
44. A good temper for arms	27
45. Another very hard temper	28
46. To melt iron and make it soft	28
47. To whiten iron like silver	28
48. To render iron brittle, so as to pound like glass	28
49. Ingredients which serve to the melting of iron	28
50. To melt or calcinate the blade of a sword without hurting the scabbard	29
51. A spirit which will dissolve all sorts of stones	29
52. To refine pewter	29
53. To fix mercury	29
54. To extract mercury from lead	29
55. The composition of cast mirrors and cylinders	30
56. The composition of metallic mirrors, or looking-glasses, used among the ancients	30
57. To make convex and ardent mirrors	30
58. To give tools such a temper, as will enable them to saw marble	31
59. To soften iron, and harden it afterwards more than it was before	32
60. The transmutation of iron into damask-steel	32
61. To guard iron against rusting	32
62. To cut pebbles with ease	32
63. To whiten copper	33
64. A projection on copper	33
65. The preparation of emery	33
66. A factitious amiant; or way to make an incom-bustible cloth	34
67. To render tartar fusible and penetrating	35
68. To extract mercury from any metal	35
69. To dye in gold, silver medals, or laminas, through and through	36
70. To make a perpetual motion	37
71. A secret fire	37
	72. An

Art.		Page
72.	An oil, one ounce of which will last longer than one pound of any other	37
73.	To make a coppel with ashes	37
74.	To folder iron, or any other metal, without fire	38
75.	To folder with fire	38
76.	To make borax	39
77.	To render iron as white and beautiful as silver	39
78.	To calcine pewter, and render it as white and hard as silver	39
79.	Another to the same purpose	39
80.	To whiten brass	40
81.	Another method	40
82.	To extract gold from silver	40

C H A P. III.

Of the Composition of Varnishes, &c.

1.	A gold varnish	42
2.	How to prepare the lintseed oil with the <i>hepatica aloes</i> , for the above purpose	42
3.	How to draw the tincture of <i>rocou</i> used in the composition of the above varnish	42
4.	A varnish for icing	43
5.	An excellent varnish	43
6.	For colouring and preserving gates, poles, barns, &c.	43
7.	A red varnish	43
8.	A black varnish	44
9.	To make ivory black for the above purpose	44
10.	A varnish for floors	44
11.	A varnish from Flanders	45
12.	A varnish to lay on canvas sashes	45
13.	A varnish of shell-lac, for pictures	45
14.	Another varnish for pictures	45
15.	Another sort	45
16.	The Chinese varnish	45
17.	To imitate jasper, or variegated black marble	46
18.	Another way	46
19.	An	

Art.	Page
19. An excellent varnish to give a fine gloss to jasper, or variegated black marble	46
20. A varnish which dries in two hours time	47
21. A varnish for copperplate prints	47
22. An admirable varnish	47
23. A varnish fit to lay on all sorts of colours	47
24. A varnish known under the appellation of <i>Beaume-blanc</i> , or white balm	48
25. A varnish to be used on plaster, and any other sort of materials	48
26. An excellent varnish, in which may be put and diluted, whatever colour you like.—It suits, equally well, goldsmiths and limners	48
27. A <i>Chinese</i> varnish suitable to all sorts of colours	48
28. <i>Chinese</i> varnish, more particularly calculated for miniature painting	49
29. How to make a red, with a varnish, of a much higher hue than coral itself	49
30. To make it gridelin colour	49
31. To make it green	49
32. Another way for the same	49
33. To make it yellow	49
34. To make it blue	50
35. Another sort of varnish	50
36. A transparent varnish, fit for all sorts of colours	50
37. To make fashes with cloth, which will be very transparent	50
38. The varnish fit for the above fashes	50
39. A fine white varnish	51
40. A varnish to prevent the rays of the sun from passing through the panes of window glasses	51
41. To raise a relief on varnish	51
42. To render silk stuffs transparent, after the <i>Chinese</i> manner; and paint them with transparent colours likewise, in imitation of the <i>India</i> manufactured silks	52
43. To make a transparent blue hue for the above purpose	52
44. To make a transparent yellow hue for the same use	52
45. To	52

Art.

	Page
45. To make a transparent green	53
46. To give the abovementioned painted silks, all the smell and fragrance of the <i>India</i> ones	53
47. The true receipt of the <i>English</i> varnish, such as is laid on sticks and artificial-made canes	53
48. A fine varnish for all sorts of colours	54
49. A varnish to lay on after the isinglass	54
50. A varnish to gild with, without gold	55
51. A varnish water proof	55
52. <i>Callot's</i> varnish, mentioned in chap. I. p. 2.	56
53. A varnish to lay on paper	57
54. Another varnish	57
55. L'Abbe <i>Mulot's</i> varnish	57
56. A varnish to lay over plaster-works, or figures	57
57. A very fine red varnish	58
58. A varnish to gild certain parts of stamped leathers, silvered in some places with pewter-leaves, and otherwise adorned with running stalks of flowers, various colours, figures, and other sorts of embellishments	58
59. To imitate porphyry	59
60. To imitate serpentine	60

C H A P. IV.

Of Mastichs, Cements, Sealing-wax, &c,

1. A subtile mastich to mend all sorts of broken vessels	61
2. Another	61
3. A mastich to make rock-works	61
4. An excellent mastich	61
5. A mastich for broken wares	61
6. Another mastich	62
7. Another	62
8. A cement	62
9. A glue to lay upon gold	62
10. A size	62
11. An exceeding good size, called <i>Orleans size</i>	62
12. A	62

Art.	Page
12. A cement for delph, and other earthen wares	62
13. Another for the same purpose, which resists water	63
14. A cold cement for cisterns and fountains	63
15. A lue to join broken vessels	63
16. A strong glue with soft cheese	63
17. To make a strong maltich	63
18. To make corks for bottles	64
19. To imitate rock works	64
20. To rub floors with, whether boards, bricks, &c.	64
21. A composition to make a relief fit to gild over, or even to raise an embroidery	64
22. Sealing wax: <i>Recipe 1st</i>	65
23. Another sealing wax: <i>Recipe 2^d</i>	65
24. Another. <i>Recipe 3^d</i>	65
25. Another. <i>Recipe 4th</i>	66
26. Another. <i>Recipe 5th</i>	66
27. Another. <i>Recipe 6th</i>	66
28. Another. <i>Recipe 7th</i> Excessively good	66
29. Another. <i>Recipe 8th</i>	67
30. An excellent sealing wax, by <i>Girardot</i> . <i>Recipe 9th</i>	67
31. A colour for the above wax	67

C H A P. V.

Of Glass Manufactory, and the making Compositions to imitate Precious Stones, commonly called *French Paste*.

1. The general composition of the paste to make spurious precious stones, such as emeralds, sapphires, rubies, &c.	68
2. To make emeralds, and other precious stones	68
3. To calcine calcedony stone and chrystral, in order to compose precious stones with them	70
4. To make emeralds	70
5. For topazes	71
6. For sapphires	71
7. For amethysts	71
8. For	

Art.		Page
8.	For hyacinths	— 71
9.	For rubies	— 71
10.	Another way to make emeralds	— 71
11.	Another composition for hyacinths	— 72
12.	Another for rubies	— 72
13.	To make diamonds	— 72
14.	A water to harden artificial stones	— 72
15.	A dye, to put under true and false diamonds, when they are set	— 73
16.	How to make white sapphires, to imitate true diamonds	— 73
17.	A better way of doing the same	— 74
18.	A colour to make rubies	— 74
19.	To whiten amethysts	— 75
20.	To make emeralds light and hard	— 75
21.	To give chrystral a perfect hardness	— 76
22.	A cement to render chrystral like diamonds, and give the sapphires of <i>Alenson</i> a hardness to cut glass with ease	— 76
23.	To make chrystral throw off as much fire as diamonds	— 76
24.	Another way of making diamonds	— 76
25.	To give the white amethyst the colour of a true diamond.	— 77
26.	To imitate calcedony	— 77
27.	To make a chrysolite	— 77
28.	To make diamonds with <i>jargons</i>	— 77
29.	To make <i>doublets</i> in rubies and emeralds, as they do at <i>Milan</i>	— 78
30.	To soften ch ystral	— 79
31.	Another to soften chrystral, or any other coloured stone, so that you may cut it like cheese; and restore it afte wards to its primary hardness	— 79
32.	Another equally useful to soften chrystral and steel	— 80
33.	A paste which will procure as beautiful emeralds as natural ones	— 80
34.	Another way of making emeralds	— 80
35.	To whiten imperfect diamonds	— 81
36.	To counterfeit diamonds	— 81
37.	Various	

Art.	Page
37. Various dyes for precious stones	82
38. A colour for glasses and enamels	82
39. Another ruby colour	83
40. Another of the invention of <i>Sainte Marie</i> the enameller	83
41. A composition, the fundamental basis of all enamels	83
42. To make an enamel as white as milk	84
43. To make an enamel, turquoise colour	85
44. How to prepare the scories of copper for the above purpose	85
45. To make blue enamel	85
46. To make green enamel	86
47. To make a black shining enamel	86
48. To make an enamel, purple colour	86
49. Another	87
50. A yellow enamel	87
51. To make a chrystraline matter which serves as a basis to red-colour enamels	87
52. How to make a fine preparation of <i>Fusible Magnesia</i> , to be employed in the making of red enamel	88
53. To make red enamel of a beautiful ruby hue	88
54. To make an enamel, true <i>Balais-ruby</i> colour	88
55. To make a bright enamel, <i>escarboucle</i> colour	89
56. To give rock crystal the various colours of topaz, rubies, opal, heliotrope, and others	89
57. The method of counter drawing on artificial stones, the original cameos, intaglios, and other gems, which are kept and preserved in the several museums of <i>Europe</i>	90
58. To jasper glass globes	91
59. To give globes a silver colour	92
60. A good method for tinning glass globes	92
61. To make the same in colours	92
62. To stick these globes upon one another	92
63. To make transparent frames	93
64. Another	93
65. Another	93

Art.	Page
65. Another way, which will make the frame look as made of glass	93
66. A white paint to preserve the putty round the panes of glass	93
67. To clear glass	94
68. How to distinguish a true from a false stone	94
69. Another to the same purpose	94
70. To make pearls, and swell them to what size you please	94
71. To dye crystal ruby hue, with lake	96
72. To make a sapphire	96
73. Another composition for the sapphire	97
74. To make an amethyst	97

C H A P. VI.

Concerning Colours and Painting.

§ I. *To paint in varnish on wood. (Useful to
Carriage Painters.)*

1. The preparations previous to the laying of colours, and the general process observed in laying them on it	98
2. To make a black	98
3. To make a blue	99
4. To make the Gridelin	99

§ II. *To paint on paper.*

5. For the red	99
6. To make a fine yellow	99
7. To make a green	99
8. To transfer a print on vellum, and then paint it	99

§ III. *Com-*

§ III. Composition for limners.

9. How to prepare colours for limning	—	100
10. To make what is called <i>lamp-black</i>	—	100
11. Another way of making black	—	100
12. To make a blue	—	100
13. To make a turquin blue	—	101
14. A fine green for limning	—	101
15. Another for the same purpose	—	101
16. To make <i>Sap-green</i> , or blackberry green	—	101
17. To make lake	—	101
18. To make a liquid lake	—	101
19. Another way	—	102
20. For the vermillion	—	102
21. For the making of carmine	—	102
22. Colours fit for expressing the various complex- ions	—	102

§ IV. To make transparent colours.

23. For the green	—	103
24. For the red	—	103
25. For the yellow	—	103
26. For the blue	—	103
27. Another blue, very like ultramarine	—	103
28. A pale red to paint on enamel	—	104
29. Process of making purple, for painting on enamel	—	104
30. How to make a fine flesh colour	—	105
31. A good way to make carmine	—	105
32. Another way	—	105
33. The whole process of making ultramarine	—	106
34. Another very fine ultramarine	—	106
35. A very good and experienced pastil to make ul- tramarine of	—	107
36. The way of mixing the <i>lapis</i> with the pastil, to make ultramarine	—	108
37. Another		

Art.

Page

37. Another secret to compose a fine blue, for wash-	109
ing in drawings, instead of ultramarine, which	
is too dear, and too strong to be used for that	
purpose	
38. The true secret of making <i>Iris</i> green	110
39. To make a dark green for miniature pictures,	
washing on paper, or draperies and terraces	111
40. To make the bistre for the wash	111
41. The secret for a fine red for the wash	112
42. A secret to make carmine at a small expence	112

§. V. Composition of colours, to dye skins or gloves.

43. A lively Isabel	112
44. For a pale filbert colour	112
45. For the gold colour	113
46. For the flesh colour	113
47. The straw colour	113
48. A fine brown	113
49. To make a fine musk colour	113
50. To make a frangipane colour	113
51. An olive colour	113
52. How to make skins and gloves take these dyes	114
53. To varnish a chimney	114

§. VI. To colour or varnish copperplate prints.

54. To varnish copperplate prints	114
55. How to colour these prints, in imitation of	
pictures in oil colours	115
56. A varnish which suits all sorts of prints and pic-	
tures, stands water, and makes the work	
appear as shining as glass	115
57. To make appear in gold, the figure of a print	116
58. A curious secret to make a print imitate the	
painting on glass	116
59. Another to the same purpose	117
60. The method of chalking, for those who are not	
acquainted with drawing	118
61. To prepare a transparent paper to chalk with	119

§ VII. *For painting on glass.*

62. How to draw on glass	—	—	119
63. A colour for grounds on glass	—	—	119
64. Preparations of lake for glass	—	—	120
65. Preparation of the blue purple, for glass	—	—	120
66. Preparation of the green, for glass	—	—	120
67. Preparation of the yellow for the same	—	—	120
68. Preparation of the white	—	—	120
69. The proper varnish to be laid on glass after painting	—	—	121
70. How to paint on glass without fire	—	—	121

§ VIII. *Preparations of colours of all sorts, for
oil, water, and crayons.*

71. An oil to grind colours with, when the works are much exposed to the injuries of the weather	—	—	121
72. To marble and jasper paper	—	—	121
73. To clean pictures	—	—	122
74. Another for the same purpose	—	—	122
75. A secret to render old pictures as fine as new	—	—	123
76. An oil to prevent pictures from blackening. It may serve also to make cloth to carry in the pocket, against wet weather	—	—	123
77. A wash to clean pictures	—	—	123
78. Another way	—	—	123
79. Another way	—	—	123
80. A very curious and simple way of preventing flies from sitting on pictures, or any other furniture, and making their dung there	—	—	123
81. To make indigo	—	—	124
82. To make a yellow	—	—	124
83. An azure of mother of pearl	—	—	124
84. A white for painters, which may be preserved for ever	—	—	124
85. Another white for ladies' paint	—	—	124
86. A good azure	—	—	125

Art.	Page
87. An azure from silver, done in less than a fortnight	125
88. To make an azured water	125
89. Another way of making azure	126
90. A fine azure	126
91. Another way	126
92. Another way	126
93. To make an admirable white lead, fit for oil-painting and colouring of prints	127
94. The preparation of verdigrease	127
95. A fine liquid green	127
96. To make the <i>Stil de-grain</i> , or <i>brown pink</i>	127
97. To make a fine vermilion	128
98. A secret to draw without either ink or pencil	128
99. To make an imitation of enamel on tin, for chimney-branches, &c.	128
100. A valuable secret to make exceeding good crayons, as hard as red chalk. Discovered by Prince Rupert, brother to Prince Palatine	128
101. To render the stone-cinnabar and vermilion finer, and at the same time to prevent them from blackening	129
102. Process used in making Eastern carmine	129
103. The process observed in making the lake	131
104. To make the fine columbine lake	132
105. A fine red water for miniature painting	133
106. The receipt of the fine <i>Venetian lake</i>	133
107. Directions for colouring prints	135
108. Directions for the mixture of colours	136
109. Directions for painting <i>fresco</i>	137
110. Directions for the choice, use, and composition of the colours employed for the above purpose	137
111. Directions for painting in oil on a wall.	
Method 1	139
Method 2	139
Method 3	140
114. Directions for painting in oil on wood	140
115. Directions for painting in oil on canvas	140
116. Which colours are used for the above purpose	142
117. Which	

Art.	Page
117. Which oils are used in painting	144
118. To take off instantly a copy from a print, or a picture	145
119. Directions for making the Spanish carnation	145
120. To make the Spanish ladies rouge	145
121. A fine lake made with shell-lac	146
122. Directions to make cinnabar, or vermillion	146
123. Another method of making cinnabar	147
124. An azure as fine as, and which looks similar to ultramarine	149
125. The same as practised in Germany	149
126. Another very fine azure	149
127. Another	149

§ IX. Preparation of the *lapis lazuli* to make ultramarine.

128. 1st. The general manipulation of the whole process: each single part of which shall be treated of in particular afterwards.	150
129. 2d. Directions to be observed in the process of preparing the strong cement, in which the <i>lapis lazuli</i> is to be incorporated, to draw afterwards the azure from it	152
130. Another cement, of a softer nature	153
131. Directions to prepare and purify the linseed oil for the azure	154
132. The lye to wash the ultramarine with	154
133. Another sort of lye for the same purpose	155
134. Directions for the choice of the vessels in which the most impure ultramarine is to be washed, &c.	155
135. Observations for discerning the good or bad qualities of the <i>lapis lazuli</i> , from which you intend to compose ultramarine	156
136. The method of calcining, and preparing the <i>lapis lazuli</i> , in order to grind it afterwards	157
137. Directions for making the liquor fit to grind the <i>lapis</i> with, in order to make the ultramarine	158
138. The	

Art.	Page
138. The method of grinding the <i>lapis lazuli</i> on porphyry, and the signs which attend it	159
139. The method of incorporating the grinded <i>lapis lazuli</i> , with either of the strong or soft cements	160
140. Directions for extracting the azure out of the cement	161
141. Observations on the colours of the azures at their coming out of the cement, and the signs which attend them	162
142. The washing and purifying of the azures after they are got out of the cement	163
143. Another way of purifying the same	163
144. Another secret for purifying azures	164
145. How to run the azures, after having been thus cleansed, washed and purified	164
146. The method of making the green azure	165
147. Another sort of green azure	165
148. A very fine method for marbling paper	166

C H A P. VII.

Relative to the Art of Gilding.

1. The method of gilding with size or oil	167
2. To gild with size, or what is called burnish gold	168
3. To gild without gold	172
4. Another to the same purpose	173
5. A gold without gold	173
6. The preparations of the gum water	173
7. To write in gold or silver	173
8. To gild on glasses, earthen, or china wares	173
9. To write or paint in gold colour	174
10. To write or paint in silver, especially with a pencil	174
11. To whiten and silver copper medals	174
12. A water to gild iron	175
13. To whiten exteriorly copper statues	175
14. To write in gold letters on pots or boxes	175
15. To gild silver in water-gilding without the assistance of mercury	175
16. The	175

Art.

Page

16. The <i>sauce</i> , which is to be used for colouring silver plates, gilt with the above-described powder	176
17. A water which gilds copper and bronze. A secret very useful for watch and pin-makers	177
18. Another	177
19. To gild steel or iron, after being well polished	177
20. To silver copper figures	177
21. To silver or gild pewter	178
22. A composition to lay on lead, tin, or any other metal, in order to hold fast the ready gilt leaves of pewter which are applied on it; useful for gilding on high steeples, domes, &c.	178
23. To clean and whiten silver	179
24. The preparation of gold in shell	179
25. To bronze in gold colour	179
26. Another to the same purpose	179
27. How to matt burnished gold	180
28. How to do the same to burnish silver	180
29. The method of applying gold, or silver in shell, on the wood	180
30. To gild sandy gold	180
31. The varnish fit to be laid on gilding and silvering	181
32. The method of bronzing	181
33. A water to gild iron with	181
34. To make the fine writing gold	181
35. How to get the gold or silver out of gilt plates	182
36. To gild paper on the edge	182
37. To gild on veillum	182
38. Another way	182
39. Another way	182
40. A gilt without gold	183
41. To gild without gold	183
42. To gild on calf and sheep skin	183
43. Gold and silver in shell	183
44. To gild marble	183
45. To	

Art.	Page
45. To apply gold on glazed wares, chrystral, glaſſ, china, &c. ——————	183
46. Matt gold in oil ——————	184
47. To dye any metal, or ſtone, gold colour, without gold ——————	184
48. To whiten copper ——————	184
49. To whiten ſilver without the affiſtance of fire	184
50. To whiten iron like ſilver ——————	184

C H A P. VIII.

The Art of Dying Woods, Bones, &c.

1. The composition for red ——————	185
2. Another red ——————	185
3. Another way ——————	185
4. To dye wood in a purpliſh colour ——————	186
5. A blue purple ——————	186
6. Another ——————	186
7. A blue for wood ——————	186
8. A green ——————	186
9. A yellow ——————	186
10. Another yellow ——————	187
11. Another finer yellow ——————	187
12. To dye wood in a fine polished white ——————	187
13. To dye in polished black ——————	187
14. Another way ——————	187
15. To imitate ebony ——————	187
16. Another way ——————	187
17. Another way ——————	188
18. A fine black, eaſily made ——————	188
19. To dye wood ſilver fashion ——————	188
20. To dye in gold, ſilver, or copper ——————	188
21. To give nut, or pear-tree, what undulation you like ——————	188
22. To imitate the root of nut tree ——————	189
23. To give a fine colour to the cherry-tree wood ——————	189
24. To marble wood ——————	189
25. To imitate white marble ——————	189
26. To imitate black marble ——————	189
27. A	

Art.		Page
27. A counter-faction of coral	—	190
28. To take the impression of any seal	—	190
29. Another way	—	191
30. To get birds with white feathers	—	191
31. To soften ivory	—	191
32. To dye ivory thus softened	—	192
33. Another way to soften ivory	—	192
34. To whiten ivory which has been spoiled	—	192
35. To whiten green ivory: and whiten again that which has turned a brown yellow	—	192
36. To petrify wood, &c.	—	193
37. To imitate tortoiseshell with horn	—	193
38. A preparation for the tortoiseshell	—	193
39. To dye bones, and mould them in all manner of shapes	—	193
40. To dye bones in black	—	194
41. To soften bones	—	194
42. To dye bones in green	—	194
43. A salt for hardening soft bones	—	195
44. To make figures, or vases, with egg shells	—	195
45. To dye bones and ivory of a fine red	—	195
46. To make a paste in imitation of black marble	—	195
47. To dye marble, or alabaster, blue or purple	—	196

C H A P. IX.

Of Casting in Moulds.

1. How to cast figures in moulds	—	197
2. To cast a figure in bronze	—	197
3. How to gild such sorts of figures	—	205
4. Of the choice and composition of metals	—	206

C H A P. X.

Secrets relative to the making of curious and useful sorts of Ink.

Art.		Page
1.	A good shining ink	207
2.	To write on grease, and make the ink run on it	207
3.	An ink-stone, with which ink-stands may be made, and with which you may write without ink	208
4.	To write with common clear water	208
5.	A good ink both for drawing and writing	208
6.	To make very good ink without gall-nuts, which will be equally good to wash drawings and plans, and strike very neat lines with the pen	209
7.	An invisible ink	209
8.	Another way	209
9.	To make good India ink	209
10.	Red ink	210
11.	A green ink	210
12.	To make an ink which appears, and disappears alternately	210
13.	The invisible method of conveying secrets. 1st. ink	211
14.	An ink to write over the other. 2d. ink	211
15.	Another ink which effaces the second, and makes the first appear. 3d. ink	211
16.	An ink which will go off in six days	212
17.	Another which you may rub off when you please	212
18.	Powder ink	212
19.	An exceeding good writing ink	212
20.	A gold colour ink, without gold	213
21.	Another way	213
22.	To write in silver without silver	213
23.	A good shining ink	213
24.	A blue ink	213
25.	A yellow ink	214
26.	A	

	Page
Att.	
26. A green ink which may keep two years	214
27. A shining ink	214
28. A way of writing which will not be visible, unless you hold the paper to the sun, or to the light of a candle	214
29. A secret to revive old writings which are almost defaced	215
30. To write in gold or silver letters	215
31. An iris on white paper	215
32. A shining ink	216
33. A common ink	216
34. How to prepare printers ink	216
35. The preparation of the ink which serves to write <i>inscriptions, epitaphs, &c. on stones, marbles, &c.</i>	217
36. The various ways of making an ink for writing. 1st. Method	217
37. Another way. 2d. method	217
38. Another way. 3d. method	217
39. Another way. 4th. method	218
40. Another way. 5th. method	218
41. Another way. 6th. method	218
42. Another way. 7th. method	219
43. Another way. 8th. method	219
44. Another way. 9th. method	219
45. An ink which may be made instantly	219
46. Another way to the same purpose	219
47. A portable ink, without either gall-nut or vitriol	220
48. Another portable ink, in powder	220
49. Another portable powder, to make ink instantly	220
50. Another sort of powder to the same purpose	220
51. A yellow ink	221
52. Another way	221
53. Another way	222
54. Another sort of yellow liquor	222
55. Another way	222
56. Another way superior to all the rest	222
57. Of the use of sugar-candy in ink	222
Q 2	58. A

Art.	Page
58. A sort of black ink for painting figures, and to write upon stuffs, and linen, as well as on paper	223
59. To prevent ink from freezing in the winter	223
60. How to renew old writings almost defaced	223
61. A green ink	223
62. Another way	224
63. To write in gold letters, on iron or steel	224
64. An ink which writes like silver, without silver in it	224
65. To write on silver in black which will never go off	224

C H A P. XI.

Secrets relative to Wine.

1. To make a wine to have the taste and flavour of French muscat	225
2. To make the vin-doux	225
3. To make the vin bourru, of an excellent taste	225
4. To imitate a malvoisie	225
5. To change red wine into white, and white into red	226
6. To prevent wine from fusting, otherwise tasting of the cask, and to give it both a taste and flavour quite agreeable	226
7. To make a vine produce a sweet wine	226
8. To make a sweet wine of a very agreeable flavour, and besides very wholesome	226
9. To clarify in two days new wine when muddy	226
10. To make the wine keep mout, or unfermented, for twelve months	227
11. To make a wine turn black	227
12. To clarify a wine which is turned	227
13. To correct a bad flavour in wine	227
14. To prevent wine from spoiling and turning	227
15. To prevent thunder and lightning from hurting wine	227
16. To prevent wine from corrupting	228
17. To restore a wine turned sour or sharp	228
18. To	

Art.	Page
18. To restore a wine corrupted and glairy.	228
19. To prevent wine from growing sour, and turning into vinegar	228
20. To make a new wine taste as an old wine	228
21. To restore a wine turned	228
22. To restore a wine fested or tasting of the cask	228
23. To prevent wine from pricking	229
24. To make wine keep	229
25. To clarify wine easily	229
26. To prevent wine from turning	229
27. To correct a musty taste in wine	229
28. Another method	229
29. To correct a sour, or bitter taste in wine	230
30. To restore a spoilt wine	230
31. To sweeten a tart wine	230
32. Another way	230
33. To prevent tartness in wine	230
34. To heighten a wine in liquor, and give it an agreeable flavour	230
35. To give wine a most agreeable flavour	231
36. How to find out whether or not there be water mixed in a cask of wine	231
37. To separate the water from wine	231
38. To ungrease wine in less than twenty-four hours	231
39. To restore a wine	232
40. To correct a bad taste and sourness in wine	232
41. Another way	232
42. Another way	232
43. To cure those who are too much addicted to drink wine	232
44. Another method no less certain	233
45. To prevent one from getting intoxicated with drinking	233
46. Another way	233
47. Another way	233
48. Another way	233
49. Another method	233
50. Another way	234
51. A method of making people drunk without endangering their health	234
52. Another	

Airt.	Page
52. Another way —	234
53. To recover a person from intoxication	234
54. To prevent the breath from smelling of wine	234
55. To preserve wine good to the last	234

C H A P. XII.

Concerning the Composition of Vinegars.

1. To make good wine vinegar in a short time	235
2. To change wine into strong vinegar	235
3. To make very good and strong vinegar with the worst of wines —	235
4. To turn wine into vinegar in less than three hours —	235
5. To restore such a wine to its first taste	236
6. An excellent preparation of vinegar	236
7. To render vinegar alkali —	236
8. To make in one hour good rose vinegar	236
9. Another method to make such vinegar in an instant —	236
10. To operate the same in one hour's time, on a larger quantity of wine —	237
11. The receipt of the vinegar, called the Grand Constable's vinegar —	237
12. A secret to increase the strength and sharpness of the vinegar —	237
13. Another way to do the same —	237
14. The secret for making good vinegar, given by a vinegar-man at Paris —	238
15. To make vinegar with water —	238
16. To make good vinegar with spoiled wine	239
17. A dry portable vinegar, or the vinaigre en poudre —	239

C H A P. XIII.

Secrets relative to Liquors and Essential Oils.

Art.		Page
1. To make as good wine as Spanish wine	—	240
2. Another way to imitate Spanish wine	—	241
3. To make the rossolis	—	241
4. To make a rossolis which may serve as a foundation to other liquors	—	242
5. To make amborsy	—	242
6. For the nectar	—	242
7. A common rossolis	—	242
8. Another rossolis	—	242
9. Another way	—	243
10. To make Eau de Franchipane	—	243
11. Orange-flower water made instantly	—	243
12. Muscadine rose-water	—	244
13. To make raspberry, strawberry, cherry, or other such waters	—	244
14. Lemonade water at a cheap rate	—	244
15. Apricot water	—	244
16. To make exceeding good lemonade	—	245
17. To make orangeade the same way	—	245
18. To make Eau de Verjus	—	245
19. To make orgeat-water	—	245
20. Other waters	—	246
21. To make a cooling cinnamon water	—	246
22. To make coriander water	—	246
23. Anise-seed water	—	246
24. Citron water	—	246
25. Cinnamon water	—	247
26. To make cedrat water	—	247
27. To make cedrat another way	—	247
28. Juniper water	—	248
29. To make good hydromel, otherwise methyglin	—	248
30. To make eau d'ange	—	248
31. Another eau d'ange	—	249
32. Another eau d'ange	—	249

Art.	Page
33. A light and delicate rossolis, known under the denomination of populo	249
34. Anglic water	250
35. The preparation of musk and amber, to have it ready when wanted to put in cordials	250
36. To make eau de cete	250
37. To make the compounded eau clairette	250
38. The cinnamon water	251
39. Strong aniseed water, or animated brandy	251
40. To make white ratafia, called otherwise eau de Noaiu, or kernel water	251
41. Hypocras, both the red and white sort	252
42. To make good rossolis	252
43. An essence of hypocras, to make the liquor instantly, and at will	252
44. An exceeding good ratafia	253
45. An essence of ambergris	253
46. Another and shorter way of making the same	254
47. A smelling water	254
48. A receipt to compose one pint of rossolis, with which you can make forty	254
49. To make a rossolis after that of Turin	255
50. How to make a Sherbet, a Persian species of punch	255
51. An exceeding fine essence of hypocras	256
52. To make Vin des dieux	256
53. Burnt wine	256
54. To imitate muscat wine	257
55. Eau clairette simple	257
56. A violet water	257
57. To make a clear and white hypocras	257
58. For the white hypocras	258
59. To make the true eau-de-Noiau	258
60. To make eau-de Fenouillette, such as it comes from the Isle of Retz	258
61. To make an hypocras with water	259
62. Of the various liquors with which hypocras may be made	260
63. A rossolis, Turin fashion	260
64. An admirable oil of sugar	260
65. Another oil of sugar without the assistance of fire	261
66. An	

I N D E X.

345

Art.	Page
66. An admirable essence of red sugar	201
67. Another oil of sugar, excessively good	261
68. How to extract the essential oil from any flower	262
69. Essence of jessamine, roses and other flowers	262
70. To draw the essential oil of roses	262
71. The oil of cinnamon	263
72. An essence of jessamine	263
73. Essence of ambergris	263
74. Essence of capon and other fowls	264
75. Virginal milk	264
76. How to make the hipotique	264
77. An exceeding good ptisan	265
78. How to colour any sort of liquor	265
79. A ladies fine rouge, not at all hurtful to their skin like other rouges, wherein there always enters a mixture of lead or quicksilver	265
80. A fine smelling water at a small expence	265
81. Eau imperial, or imperial water	266
82. The syrup of orgeat of Montpelier	266
83. To make an imitation of coffee	267
84. Another way	267
85. Directions for preparing the true coffee	268
86. A receipt for making of chocolate	268

C H A P. XIV.

Secrets relative to the Confectionary Business.

1. Preserved nuts	269
2. Orange flower paste	270
3. Paste of jessamine	270
4. Apricot paste	270
5. Currant paste	270
6. A verjus paste	271
7. How to make syrups with all sorts of flowers, which shall be possessed of all their taste, fla- vour and fragrancy	271
8. Raspberry syrup	271
9. Apricot syrup	272
10. The verjus syrup	272
II. A	

Art.	Page
11. A general manner of making syrups, applicable to almost all sorts of fruits, especially currants	272
12. To make liquid currant jam	273
13. To make the same with cherries	273
14. Another way to preserve cherries	273
15. To make the liquid raspberry jam	274
16. The verjus jam	274
17. The same with powder sugar	275
18. Peeled verjus	275
19. To preserve March double or single violets	275
20. Another way to make them liquid	275
21. To preserve apricots	276
22. How to make a dry preserve of them	276
23. To preserve green apricots	277
24. To make the Cotignac liquid	278
25. Another way	278
26. How to make the caramel	278
27. To make raisinet	279
28. To preserve quinces in red	279
29. To do the same in white	280
30. To preserve rousselet, muscadine, and other pears	280
31. A preserve of green almonds	280
32. To make the same into a compotte	281
33. To make dry portable cherries	281
34. The preserve of orange flowers, whether in loose leaves, buds, or bunches	281
35. A marmalade of orange flowers	282
36. To make an apricot, or peach jam	282
37. An apricot jam, after the French way	283
38. To make raspberry, currant, and cherry jam	283
39. To make a good currant jelly	283
40. To make a verjus jelly	284
41. To make an apple jelly	284
42. To make the conserve of orange flowers	284
43. A conserve of violets	285
44. A conserve with raspings of Portugal oranges and lemons, conjointly or separately	285
45. To make almonds a-la-praline	285
46. To	

Art.	Page
46. To whiten cherries, currants, raspberries, grapes, strawberries, and such like fruits	286
47. To make ice maroons	286
48. To make the royal mafsepins	287
49. To make Savoy biscuits	288
50. To make bitter almond biscuits	288
51. To make meringues	288
52. The same with cinnamon, or chocolate	289
53. Another way of icing	289
54. To make gimblettes	289
55. To make biscotins	290
56. To make lemon lozenges	290
57. How to preserve orange peels all the year, but especially in May	291
58. To make a paste with whatsoever fruit it may be	291
59. The Genoa paste	292
60. Quinces jam, and other fruits	292
61. Genoa biscuits	292
62. The queen's cakes or biscuits	292
63. Macaroons	292
64. Particular method of making cakes	293
65. A cream which cuts as a rice pudding	293
66. To make an exceeding good boiled cream	293
67. To make whipped cream	294

§ II. Of Summer Compottes, or stewed Fruits.

68. The raspberries compotte	294
69. The apricots compotte	294
70. To make a compotte of fruits as above, and even plums broiled	295
71. To make a compotte of perdigron plums	295
72. The same for mirables, purple and black damask, Sainte-Catherine, and other plums	295
73. Compottes of verjus in grain	295
74. Compottes of peeled verjus	296
75. Com-	

Art.		Page
75. Compottes of early pears called muscat	—	296
76. The compotte of the largest sorts of pears, such as Beurre, Messire Jean, Bergamotte, Verte-longues, Bzidery, Mouilie-bouchee, Amandotte, Doublefleur, Bonchretien d'hyver, Franc-real, &c. &c.	—	297
77. A compotte of pears a-la-braise	—	297
78. A compotte of apples a-la-bouillone	—	297

C H A P. XV.

Secrets relative to the Art of Preparing Snuff.

1. How to reduce tobacco into powder	—	298
2. How to purge snuff, and prepare it for admitting of odours	—	298
3. How to perfume snuff with flowers	—	299
4. Another way to do the same	—	299
5. Another method	—	299
6. Snuff of mille fleurs	—	300
7. The odoring snuff, after the method practised at Rome	—	300
8. The snuff with the odour of civet	—	300
9. Amber snuff	—	301
10. The odoring snuff, Maltese fashion	—	301
11. The true Maltese method of preparing snuff	—	301
12. The Spanish method of preparing perfumed snuff	—	301
13. To give a red or yellow colour to snuff	—	302

C H A P. XVI.

Secrets of taking out Spots and Stains.

1. To take off iron moulds from linen	—	303
2. To take off carriage wheel grease from clothes	—	303
3. Against piss spots	—	303
4. To		

Art.

Art.	Page
4. To take off spots from cloth of any colour	303
5. A receipt against all sorts of spots, upon stuff	303
6. Against oil spots	304
7. A washing ball to take off spots	304
8. To take out pitch and turpentine spots	304
9. Against ink spots, whether on cloth or linen	304
10. Another simple remedy against ink when just spilled	304
11. Against oil spots on satin, silk, stuff, or paper	305
12. A preparation of balls against spots	305
13. For silks	305
14. To restore gold and silver laces to their former beauty	306
15. To restore Turkey carpets to their first bloom	306
16. To make tapestries resume their first brightness, when their colours have been tarnished and spoiled	306
17. To take off spots of wax from velvet of any colour, except the crimson	306
18. To take the same from silks and cambric	307
19. To wash a gold or silver, or silk embroidery, or any stuff whatever, and render it like new	307
20. To take the spots off from silk and woollen stuffs	307
21. To colour velvet in red	307
22. To revive the colour of a cloth	308
23. To take the spots off from a white cloth	308
24. To take off the spots from crimson and other velvets	308
25. To take off an oil spot from cloth	308
26. A composition of soap to take off all sorts of spots	309
27. To take the spots from a white silk or crimson velvet	309

C H A P. XVII.

Secrets relative to the Art of Fishing, Bird-Catching, &c.

Art.		Page
1. How to entice a great quantity of fish to resort to a certain place	—	309
2. Another receipt to the same purpose	—	310
3. Another way	—	310
4. Another way	—	310
5. How to get a good many birds	—	310
6. Another way	—	311
7. Another way	—	311
8. Another way	—	311
9. To preserve and multiply pigeons	—	311
10. Another for the same purpose	—	312
11. How to fatten pigeons	—	312

C H A P. XVIII.

Secrets entertaining and useful.

1. To whiten wax	—	312
2. Another way of whitening wax in large manu-factories	—	313
3. How to multiply wax	—	314
4. To make mutton suet candles, in imitation of wax candles	—	314
5. To make soap	—	314
6. To prevent any thing from burning in the fire	—	315
7. To prevent burning one's fingers in melting lead	—	315
8. A fire which cannot be extinguished by water	—	316
9. To prevent the oil of a lamp from smoaking	—	316
10. To make an incombustible wick	—	316
11. A stone which is inflammable with water	—	316
12. A		

Art.	Page
12. A receipt to make the true phosphorus, extracted from urine, and which is inflammable by the air, so that pieces of wood may be lighted by it	317
13. Fruit. To preserve trees from being injured by worms, caterpillars, &c.	318
14. To kill all sorts of worms	318
15. To kill maggots in sheep	318

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